Mental health care in general practice in the context of a system reform

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ISBN: 978-94-034-0004-4
ISBN (electronic version): 978-94-034-0006-8

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Cover design: Tessa Magnée
Lay out: Doortje Saya
Printing: Ridderprint BV

The study presented in this thesis has been performed at NIVEL, Netherlands Institute for Health Services Research, Utrecht, the Netherlands.

The studies were carried out according to Dutch privacy legislation. The privacy regulation was approved by the Dutch Data Protection Authority. According to Dutch legislation, approval by a medical ethics committee was not required for these observational studies.

rijksuniversiteit groningen

Mental health care in general practice in the context of a system reform

Proefschrift

ter verkrijging van de graad van doctor aan de
Rijksuniversiteit Groningen
op gezag van de
rector magnificus prof. dr. E. Sterken
en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op

woensdag 15 november 2017 om 14.30 uur

door

Tessa Magnée

geboren op 3 juli 1984
te Capelle aan den IJssel

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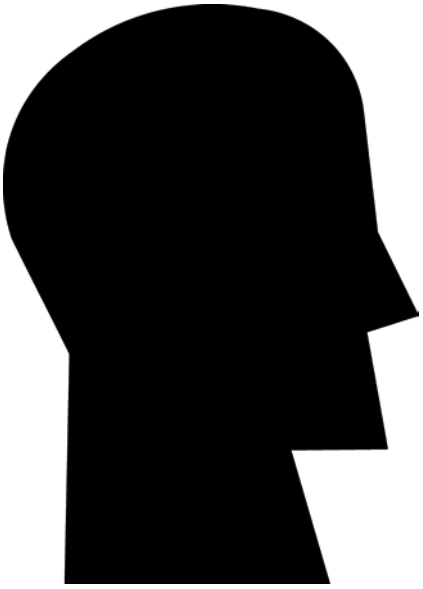
General introduction



This thesis describes changes in the mental health care provided in Dutch general practice, in the context of a major reform of the mental health care system. The main objective of this reform, introduced in 2014, was to increase the sustainability and efficiency of the mental health care system. Substitution of mental health care from specialized care towards primary care, especially general practice, was stimulated. Primary mental health care is more accessible, more affordable, and surrounded by less stigma than specialized mental health care. Access to specialized mental health care was restricted, and the capacity in specialized mental health care was reduced. At the same time, several measures were undertaken to strengthen mental health care in general practice.

The reform was likely to have a considerable impact on general practice. Therefore, it was important to monitor changes in the mental health care provided in general practice in recent years. In this thesis, we assess the consequences and the spin-off effects of the mental health care system reform in general practice. In this first chapter, we discuss the prevalence of mental health problems, and the mental health care system in the Netherlands, both before and since the reform in 2014. We particularly focus on mental health care in general practice. We end the chapter with the central aim of this thesis, our research questions, and an outline of the thesis.

1.1 Mental health problems: prevalence and treatment

Mental health problems are common and account for a large part of the burden of disease in many countries [1]. The annual prevalence of mental disorders is around 18% in the Netherlands [2], so almost one in every five people has a mental disorder each year. Of all Dutch citizens between 18 and 65 years, 44% has had a psychiatric disorder at least once in their life [3]. Depression or mood disorders and anxiety are among the most common mental health problems [2,4,5]. People with a mental disorder often experience multiple mental health problems; psychiatric comorbidity is very common [6].

Treatment of mental health problems usually consists of psychological treatment or medication, or a combination of the two. Psychological treatment is effective in improving clinical outcomes, such as depression symptoms [7], or quality of life [8]. Psychopharmacological treatment, often

antidepressants, can also be effective in improving clinical outcomes, but it can have substantial side effects, and effects are limited to patients with very severe problems [9]. In general, the effects of both psychotherapy and medication are modest. Many patients with a common mental disorder also show remission without treatment [7,10,11]. For example, approximately half of people with a depressive disorder recover without treatment. Therefore, 'treatment' is sometimes limited to 'watchful waiting'.

Not all people with mental health problems receive treatment. One tenth to one third of all individuals with a psychiatric disorder receive treatment yearly [3,12-14]. In 2009 in the Netherlands, 57% of all people with anxiety or depression received treatment in the past six months [15]. Only approximately 5% of those with a mental health disorder who did not receive any care in the previous year reported an unmet need [3,16], although other studies reported higher rates of unfulfilled needs for treatment among patients with anxiety or depression [17,18]. People with mental health problems often do not seek professional help, for example because they want to manage their own problems [13], because they are faced with practical (for example financial) or emotional (for example stigma) barriers [19], because they do not have confidence in professional help [20], or simply because they do not feel the need for treatment [20].

Treatment for mental health problems can either be provided in primary care, including general practice, or in specialized care. Treatment in primary care is usually more affordable and accessible, with less stigma, and with lower risk for medicalization than treatment in specialized care. Medicalization is the process of identifying and treating 'normal' variations in human experiences or behavior as medical conditions or disorders. Therefore, the reform of the mental health care system in 2014 was aimed at promoting the substitution of mental health care from specialized care towards primary care, especially towards general practice.

1.2 The mental health care system in the Netherlands until 2014

Until 2014, the mental health care system consisted of primary care, provided by general practitioners (GPs) and primary care psychologists, and of specialized or secondary mental health care. Traditionally, GPs have an important role in the mental health care system in the Netherlands.

1.2.1 Mental health care provided by general practitioners

Most patients with mental health problems receive mental health care from general medical health services [12,14,15,21,22], i.e. GPs. In many countries, including the Netherlands, the GP functions as a gatekeeper to secondary care. This means that patients with mental health problems who seek treatment initially visit the general practice they are registered at. Based on a clinical evaluation, the GP then decides to treat the patient him- or herself, or to refer the patient to a mental health care professional. The majority of all Dutch people with mental health problems are treated within general practice. In 2012, approximately 10% of the patients of Dutch GPs had at least one consultation for a psychological problem [23]. Only around 13% of them were referred to a mental health care professional [22]. All care provided in general practice is fully covered by the basic health insurance.

GPs have guidelines for the management of common mental health problems at their disposal [24-30]. These evidence-based guidelines, developed by the Dutch College of GPs, cover diagnostic assessment, treatment, and referral of patients with the most common mental health problems. According to the guidelines, GPs should explore the symptoms of the patients to establish a diagnosis, by asking questions about, for example, duration of symptoms, daily functioning, and life events. A screening instrument, such as the Four Dimensional Symptom Questionnaire (4DSQ)[31], can be used to explore the severity of symptoms. The 4DSQ can support GPs in distinguishing between 'normal' distress and more severe psychiatric disorders [32]. This distinction is important for treatment decisions, since patients with a psychiatric disorder will more often need specialized treatment.

When individuals with mental health problems seek professional help, mental health problems are not always recognized as such. Physicians

vary in their ability to do this [33], for example because they have varying mental health expertise. It is also likely that primary care physicians have too little time to recognize all psychological problems [34]. Patients often present vague somatic symptoms rather than psychological problems as their main concern [35,36], and long consultations may be required for the accurate detection of psychological problems [37]. According to an international comparison, Dutch GPs have a high level of ability in recognizing depression [38].

At the core of the GP mental health guidelines is the stepped care principle. Stepped care means that each treatment starts with the least invasive intervention that is expected to generate effects. Although it is a general belief that stepped care improves access and efficiency of care, it is supported by only limited evidence so far [39]. Examples of low intensity interventions are psychoeducation, (online) self-help programs, counseling, problem solving therapy, and brief cognitive behavioral therapy. Short-term psychological interventions provided in the primary care setting are accessible, are effective (although effects are often modest), and are associated with high patient satisfaction [40-45]. If a patient does not benefit from low intensity interventions, more invasive treatment can be provided. According to the Dutch guidelines for the management of anxiety and depression [24,25], treatment should start with psychoeducation. If the patient does not respond well, treatment can continue with other psychological interventions or medication. Medication can also be provided directly after establishing a diagnosis, but only if a patient shows severe suffering or dysfunction.

Mental health care provided in general practice is not always consistent with guideline recommendations [46-48]. For example, GPs often start the treatment of patients with depressive symptoms with medication [49]. However, this is not the first recommended step according to guidelines, certainly not for patients without a clinical depressive disorder, since effects are minimal or non-existent in patients with only mild depressive symptoms [9].

Not adhering to the guidelines may be a consequence of a lack of mental health knowledge or experience amongst GPs, but it could also be a result of their high workload. Guideline recommendations that require an increased time investment are followed less often than recommendations which save time [50]. Dutch GPs have a heavy workload compared to GPs

working in other countries, with a large number of registered patients, and short consultations of eleven minutes on average [51].

The guidelines also provide recommendations on referrals. The stepped care principle is not only applicable to treatment options within a certain setting, but it also applies to the treatment allocation; patients should initially be treated in primary care, instead of in specialized care, if possible. If mental health problems are very severe or recurrent, if the patient shows severe dysfunction, or if interventions provided in general practice have had no effect, the GP can decide to refer the patient to a mental health care professional. Until recently, GPs decided on the referral of patients based on their own clinical evaluation. As will be discussed in paragraph 1.3.1, referrals of patients with mental health problems have become more restricted since the mental health care system reform in 2014. This was expected to stimulate the substitution of mental health care from specialized care towards primary care, especially general practice. Several measures were taken to prepare GPs for the expected substitution of mental health care, which will be discussed in paragraphs 1.3.2 and 1.3.3.

1.2.2 Primary care psychologists

Before 2014, GPs could refer patients with non-complex psychological or social problems to a social worker or to a psychologist or psychotherapist working in primary care for short-term treatment. In the Netherlands, social workers, primary care psychologists, and GPs often work in the same health centers, and have formal agreements on collaboration [52]. In 2012, approximately 16 out of every 1,000 Dutch citizens were treated by primary care psychologists [23]. Most patients treated by primary care psychologists showed an improvement in daily functioning, and most of them within eight sessions or fewer [53]. Since 2008, treatment by primary care psychologists has been covered by the basic health insurance for all patients referred by the GP or by another medical doctor, with a maximum of eight consultations (reduced to five consultations in 2012). Until recently, patients paid a fee per consultation, but this was dismissed to stimulate treatment in primary care instead of in specialized care. Contrary to care provided by general practitioners, care provided by primary care psychologists is subject to the 'mandatory policy excess' payment. This means that patients pay for a predefined amount of their total yearly medical expenses themselves for specific health services.

The mental health care system reform in 2014 was expected to stimulate substitution of mental health care from specialized care towards primary care, including primary care psychologists.

1.2.3 Specialized mental health care

Before the reform in 2014, patients with complex problems, high risk of (self) harm, or recurrent problems were referred by GPs to specialized mental health care, for long term treatment by psychologists, psychotherapists, psychiatric nurses, and/or psychiatrists, usually working as a multidisciplinary team. These professionals worked in large regional secondary care institutions, but they also provide care as independent professionals and in the psychiatric departments of general hospitals. In 2012, approximately 44 people per 1,000 Dutch citizens were treated in specialized mental health care [23]. Specialized mental health care was covered by the basic health insurance for all patients referred by the GP or another medical doctor. A fee per consultation was introduced in 2012, but dismissed again in 2013. Treatment in specialized care is subject to the mandatory policy excess payment (see 1.2.2). Intramural or institutional care for patients with very severe problems is also part of the mental health care system, but will be left out of consideration in this thesis. Since 2012, several (financial) policy measures have been taken to restrict the volume of provided specialized care. The reform of the mental health care system in 2014 was aimed at promoting the substitution of care from specialized care and towards primary care.

1.2.4 Strengthening of primary mental health care

In general, health care costs are rising, and this represents a major area of concern for many governments. Mental health care costs increased even more than somatic health care costs [54]. To restrain health care costs, it is important to treat patients without severe mental health problems in the affordable primary care setting instead of in expensive specialized care. Previous studies suggested that up to one third of the patients who received specialized mental health care did not meet the formal criteria for a diagnosis of a psychiatric disorder in the previous year [55-57]. In the Netherlands, 14.3% of the patients treated in specialized mental health care in 2013 did not have a psychiatric disorder during the intake procedure [58]. These patients might have received treatment in primary care instead, which

is more affordable, with less stigma and less risk of medicalization than treatment in specialized care. The World Health Organization (WHO) underlines the importance of strengthening primary mental health care, where good quality services are accessible and relatively inexpensive [59]. The WHO also states that it is important to redirect funding towards community-based services, including the integration of mental health care into general health care settings [1].

Several initiatives have been launched by the Dutch Ministry of Health, Welfare, and Sports in the last two decades to strengthen primary mental health care [60,61]. The main reason for these initiatives was to prepare the mental health care system for an increasing demand for psychological treatment. The measures aimed to improve the accessibility of care by increasing capacity (for example in social work), but also aimed to improve the quality of care (for example by providing extra training for GPs and primary care psychologists). Other measures were taken to stimulate the collaboration between GPs, social workers and primary care psychologists, and between primary and specialized care. For example, primary care professionals were facilitated to consult mental health care specialists, for advice on patients with complex problems. Remarkably, this initiative especially led to a high number of patient consultations by psychiatric nurses in general practice, instead of more collaboration between psychiatric nurses and GPs. Apparently, psychiatric nurses met a need for short term treatment in general practice. Additionally, they saved GPs time [60].

1.2.5 Reasons for change

In spite of the many initiatives that were launched to strengthen primary mental health care [60,61] in recent years, increasing numbers of patients were still being referred by GPs to specialized mental health care [22]. Therefore, in 2011, the Dutch Healthcare Authority advised the government on how to best reduce the number of patients treated within specialized care [62]. The Dutch Healthcare Authority stated that the high number of referrals of patients to specialized mental health care had three causes. First, some GPs had difficulties fulfilling the gatekeeper function, because of a lack of time, or too little mental health expertise or experience. Second, patients who were referred to specialized care for diagnostic assessment often do not return to primary care, even if (further) treatment in a primary care setting was indicated. Third, treatment in specialized care was often financially

attractive for patients, compared to treatment in primary care (for example because they had to pay a fee per consultation to see a primary care psychologist).

1.3 A mental health care system reform in 2014

On the 1st of January, 2014, a mental health care system reform was introduced by the Dutch government. The main objective of the reform was to increase the sustainability and efficiency of the mental health care system. Within the reform, substitution of mental health care from specialized care towards primary care, especially general practice, was stimulated. Access to specialized mental health care was restricted. At the same time, several measures were undertaken to further strengthen mental health care in general practice.

Figure 1 gives an overview of the mental health care system since 2014. Short-term care is now called 'generalistic basic mental health care'. Since the reform, GPs have an even more important role in the mental health care system, since they have to treat all patients without a suspected psychiatric disorder within general practice according to a new referral model (see paragraph 1.3.1). General practitioners can provide short-term mental health care to these patients themselves, or delegate the care to professionals with mental health expertise working in general practice (mental health nurses, see paragraph 1.3.2). They can also use screening instruments, e-mental health, and the consultation of mental health specialists (see paragraph 1.3.3).

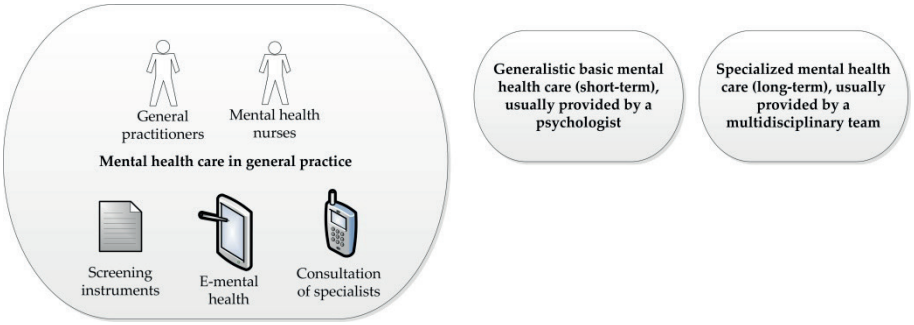


Figure 1 An overview of the Dutch mental health care system since 2014

1.3.1 A new referral model

As part of the reform, a new referral model for GPs was introduced, with the aim of restricting the number of referrals of patients without severe mental health problems to generalistic basic mental health care and specialized mental health care [63]. Figure 2 shows the new referral model, which provides guidelines for GPs. Since the reform, patients with a psychiatric disorder according to DSM criteria, but without complex problems or high risk, can be referred to generalistic basic mental health care. Besides, only patients with very complex problems, a high risk of (self) harm, or recurrent problems should be referred to specialized care. All other patients should be treated within general practice. When patients are not referred by the GP, but visit mental health professionals in generalistic basic mental health care or in specialized care on their own initiative, treatment is not covered by the health insurance. Just as before the reform, patients do pay a certain amount of money for treatment in generalistic basic mental health care or specialized mental health care, since these services are subject to the mandatory policy excess payment (see paragraph 1.2.2).

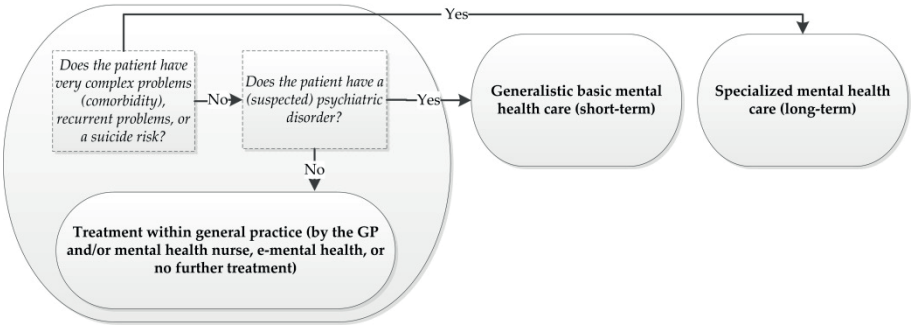


Figure 2 The new referral model for patients with mental health problems

Several measures have been taken to prepare general practitioners for the treatment of the patients with mental health problems that would have been referred to mental health care prior to the reform.

1.3.2 The introduction of mental health nurses

The introduction of mental health nurses in 2008 was one of the most prominent measures to prepare Dutch GPs to treat more patients with mental health problems within general practice. The function of the mental health nurse evolved from the consultation of psychiatric nurses (see paragraph 1.2.4). GPs receive a basic reimbursement per registered patient to employ a mental health nurse, and additional fees for mental health nurse consultations. Since 2008, the number of practices with a mental health nurse has steadily increased. In 2016, the majority of GPs employed a mental health nurse [64]. Solo practices and practices in non-urban areas employ a mental health nurse somewhat less often, compared to duo or group practices and practices in urban areas [65]. In group practices, multiple mental health nurses are often employed.

Mental health nurses work under the supervision of the GP. GPs most often employed professional(s) who were a psychiatric nurse (56%), a psychologist (35%), and/or a social worker (13%) by training as their mental health nurses [64]. Their main tasks are to perform diagnostic assessments and to provide short term care to patients with non-complex mental health problems [64]. Their presence is also thought to increase mental health expertise amongst GPs.

Previous studies have shown that treatment of (mild) psychological problems by mental health professionals in primary care seems effective, more accessible than treatment in specialized care, and leads to satisfaction

among patients and caregivers [66,67]. A Cochrane review on counseling provided in primary care in the UK [41] concluded that patients were satisfied, and that counseling was associated with enhanced clinical effectiveness compared to care as usual (but only in the short-term). Delegating the care for patients to mental health nurses may reduce the increasing workload of GPs [68] and improve the accessibility of care [69]. Nurses working in general practice are probably also more cost-effective than GPs [68,70,71].

Initially, GPs were compensated for eight hours per week of mental health nurse employment per average practice size of 2,350 listed patients. In 2016, mental health nurses could be employed for 1 FTE (or forty hours per week) per practice. In 2016, mental health nurses worked on average one and a half days a week per practice, and spent about three quarters of their time on patient care [65]. The remaining time was mostly spent on administrative tasks and meetings with the GP.

1.3.3 Other measures to strengthen mental health care in general practice

Besides the introduction of mental health nurses, other measures to strengthen mental health care within general practices included enabling the use of screening or triage instruments, e-mental health, and the possibility of consulting mental health professionals.

In 2016, about half of the GPs consulted a psychologist or psychiatrist to ask for specialized advice on a patient [64]. Previous reviews on the consultation of mental health specialists by primary care professionals suggest that it is as effective as 'care as usual' in improving clinical outcomes [72], but that it may reduce the utilization of health care services [73].

In 2016, about half of Dutch GPs sometimes used e-mental health as part of the provided treatment [64]. According to Dutch GPs, e-mental health should primarily be provided as a supplement to face-to-face consultations [74]. In 2016, 92% of the mental health nurses integrated e-mental health, such as websites or an online program, in the treatment of their patients, but they only used it for fewer than 10% of them [75].

In 2009, only a third of Dutch GPs used a screening instrument for depression [49]. According to the new referral model, GPs are explicitly expected to distinguish between patients with and without a psychiatric disorder. Therefore, an instrument to assess the severity of mental health problems can be of high value. The use of traditional questionnaires may

place a burden on patients' as well as GPs' limited time. Therefore, there is a strong need for an efficient screening method to distinguish between 'normal' distress and psychopathology, especially since the reform of the mental health care system could have a considerable impact on the demand for mental health care provided in general practice and the workload of GPs.

1.4 Consequences of the reform for general practices

The reform of the mental health care system in 2014 was likely to have a considerable impact on the mental health care provided in general practice. Figure 3 provides an overview of the possible consequences of the mental health care reform for general practice.

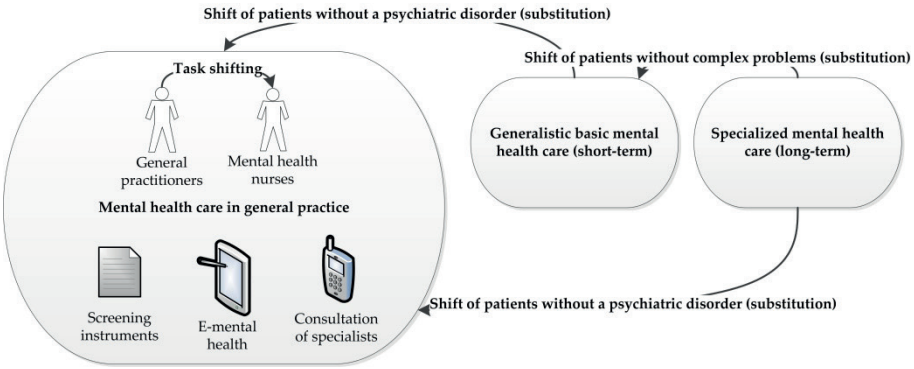


Figure 3 Expected consequences of the reform for general practices

Firstly, it was expected that the reform would stimulate a shift of patients from both specialized care and generalistic basic mental health care towards general practice (substitution). In the period 2012-2014, the number of patients treated in specialized mental health care decreased slightly, while the number of patients treated in generalistic basic mental health care showed no clear increasing or decreasing trend [76,77]. The patients who were no longer treated in specialized care were expected to shift to general practice. In chapter 2 of this thesis, we explore the potential for substitution prior to the reform. The volume of provided mental health care in general practice in recent years is described in chapter 3.

Further, it could be expected that the employment of mental health nurses influenced the mental health care provided by general practitioners. A Cochrane review on mental health workers integrated in primary care concluded that their presence modestly decreased consultation rates of primary care professionals, prescriptions of psychotropic drugs, and referrals to specialists [78], as beneficial 'spin off effects'. A shift of some of the patients with mental health problems from having consultations with the GP to mental health nurses instead could be expected (task shifting – see chapter 3). The presence of mental health nurses could also decrease the number of (too soon) prescribed antidepressants, since the employment of a mental health nurse enables the GP to first offer patients psychological treatment by the mental health nurse, instead of medication (see chapter 4).

Besides, the new referral model was expected to change the system of triage by GPs. In chapter 5 of this thesis, we explore the feasibility of the new referral model in a large primary health care center. In chapter 6, we investigate whether the efficiency of a screening instrument often used by GPs during triage to assess the presence and severity of mental health problems could be improved.

1.5 This thesis

1.5.1 Aim

The central aim of this thesis was to investigate changes in the mental health care provided in general practices in recent years, in the context of a major reform of the mental health care system. The reform, introduced in 2014, was aimed at increasing the sustainability and efficiency of the mental health care system, and it was likely to have a considerable impact on the mental health care provided in general practice. We expected a shift of patients from specialized and generalistic basic mental health care towards general practice (substitution), and thus an increase in the volume of provided care. Furthermore, we expected task shifting from GPs to mental health nurses, a decrease in antidepressant prescriptions, and changes in triage as a result of the new referral model.

In this thesis we will explore the consequences of a new mental health care policy on general practice in the following respects:

- Volume of mental health care provided in general practice
- Task shifting within general practice (from GPs to mental health nurses)
- Antidepressant treatment
- Triage of patients with mental health problems

1.5.2 Research questions

Our central research question was: 'To what extent has mental health care in general practice changed in recent years?'

We addressed the following research questions:

1. What was the potential for a shift of mental health care towards general practice, prior to the reform?
2. Has the volume of mental health care provided in general practice increased in the period 2010-2014?
3. To what extent did mental health nurses take over mental health care previously managed by GPs (task shifting)?
4. Has antidepressant treatment in general practice decreased in the period 2011-2015?
5. To what extent has the possibility of mental health nurse treatment influenced antidepressant prescriptions in general practice?
6. Is it feasible for GPs to allocate patients with mental health problems to treatment according to the new referral model, and can a more efficient 4DSQ play a role in this?

1.5.3 Outline of this thesis

Our research questions are answered in chapters 2 to 6. Firstly, we investigate the potential for substitution based on mental health care data in 2012, prior to the reform of the Dutch mental health care system in 2014 (**chapter 2**). We give an overview of the number of patients treated with and without a psychiatric disorder in primary and specialized mental health care.

Secondly, we explore the volume of care for mental health problems provided in general practice in the period 2010-2014 (**chapter 3**). We

investigate whether mental health nurses take over patients or consultations from GPs (task shifting), or if they mainly provide additional care.

Thirdly, in **chapter 4**, we explore antidepressant prescriptions for anxiety and depression in general practice in the period 2011-2015. We explore how often antidepressant prescriptions are in line with guideline recommendations. We also investigate whether the employment or consultation of mental health nurses is associated with a decrease in antidepressant prescriptions.

Next, we investigate the feasibility of the new referral model amongst GPs in a large primary health care center in 2014 (**chapter 5**). We give an overview of how many patients are allocated to treatment in general practice, to generalistic basic mental health care, or to specialized care. We explore how often treatment allocation is in line with the referral model, based on an assessment of the problems of the patient. Moreover, we assess whether the efficiency of the used screening instrument, the 4DSQ, can be improved in **chapter 6**.

Finally, in **chapter 7**, our findings are summarized and discussed. We draw general conclusions, and we elaborate on the implications for practice and future research.

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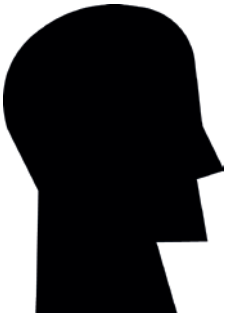
2

Potential for substitution of mental health care towards family practices: an observational study



Magnée T, de Beurs DP, Boxem R, de Bakker DH, Verhaak PF. Potential for substitution of mental health care towards family practices: an observational study. BMC Family Practice. 2017;18(1):10.

Abstract

Background
Substitution is the shift of care from specialized health care to less expensive and more accessible primary health care. It seems promising for restraining rising mental health care costs. The goal of this study was to investigate a potential for substitution of patients with psychological or social problems, but without severe psychiatric disorders, from Dutch specialized mental health care to primary care, especially family practices.

Methods
We extracted anonymized data from two national databases representing primary and specialized care in 2012. We calculated the number of patients with and without psychiatric disorder per 1,000 citizens in three major settings: family practices, primary care psychologists, and specialized care. Family physicians recorded psychopathology using the International Classification of Primary Care, while psychologists and specialists used the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition.

Results
Considerable numbers of patients without a diagnosed DSM-IV psychiatric disorder were treated by primary care psychologists (32.8%) or in specialized care (20.8%). Over half of the patients referred by family physicians to mental health care did not have a psychiatric disorder.

Conclusions
A recent reform of Dutch mental health care, including new referral criteria, will likely increase the number of patients with psychological or social problems that family physicians have to treat or support. Enabling and improving diagnostic assessment and treatment in family practices seems essential for substitution of mental health care.

Introduction

Substitution is the shift of care from specialized health care to less expensive and more accessible (primary) health care. This method seems promising for restraining rising health care costs [1]. The urgency for substitution in Dutch mental health care is high, as costs have in- creased significantly in the last years in the Netherlands [2]. Presumably, some patients treated in specialized mental health care do not have a severe psychiatric disorder, do not genuinely need treatment from specialists, and could be treated in a primary care setting instead. Previous studies suggest that up to one third or even one half of the patients who receive treatment in mental health care do not meet the formal criteria for a psychiatric disorder [3–5], although they may have other need indicators which justify treatment.

The WHO underlines the importance of integrating mental health care into general health care settings [6]. However, the consequences of enhanced primary mental health care for health care utilization and costs remain unclear. Previous reviews on consultation of mental health professionals by primary care professionals suggest that it is as effective as care as usual in improving clinical outcomes [7], but that it may also reduce utilization of health care services [8]. A Cochrane review on counselling provided in primary care in the UK [9] concluded that patients were satisfied, and that counselling was associated with enhanced clinical effectiveness compared to care as usual (but only in short-term). However, counselling in primary care did not seem to reduce overall healthcare costs. A Cochrane review on mental health workers integrated in primary care concluded that their presence might decrease consultation rates of other primary care professionals, prescriptions of psychotropic drugs, and referrals to specialists [10]. However, effects were modest and results were not consistent amongst all included studies. Moreover, economic significance of the results remained unclear. Some studies in the UK and the US suggest that enhanced primary mental health care is cost-effective [11,12], but also that it requires (extra) direct financial investments over the short-term [13].

In 2014, the Dutch government introduced a reform of mental health care to promote the substitution of mental health care towards general health care settings, especially towards family practices. According to new referral criteria (Figure 1), all patients with only mild psychological symptoms or social problems should be treated within family practices. Family physicians (FPs) are no longer allowed to refer patients without an actual psychiatric disorder to mental health care, consisting of primary care psychologists (PCPs) and specialized mental health care. Patients with a psychiatric disorder and non-complex problems (no comorbidity with for example a personality disorder or complicating psychosocial problems) should be referred to primary care psychologists (since the reform labeled as 'basic mental health care') for short-term care, while patients with complex problems should be referred to specialized mental health care for (longer term) treatment by a multidisciplinary team.

To prepare FPs for the treatment of more patients with mental health problems, the function of the mental health nurse (MHN) was introduced. Increasing numbers of Dutch FPs collaborate with an MHN: a nurse with mental health expertise, or a psychologist. MHNs can perform diagnostic research and provide short-term care [14], but they may also indirectly improve FPs' knowledge and skills in the field of mental health. Short-term psychological interventions provided in the primary care setting are accessible, seem effective, and lead to high patient satisfaction [9,15–19]. Examples of such interventions are self-help programs, counseling, problem solving therapy, and brief cognitive behavior therapy.

Although many previous studies have evaluated the integration of mental health care into primary care, it is not clear what effects a national reform aimed at a shift of patients from specialized care towards primary care might have. The aim of this study was to investigate the potential for substitution of Dutch mental health care in the context of the new referral rules for FPs. Our central research question was: what is the potential for substitution of mental health care from specialized care and PCPs to family practices, and from specialized care to PCPs?

We investigated: (1) how many patients with and without

psychiatric disorders were seen in the three mental health care settings before the reform, (2) how many patients with and without psychiatric disorders were referred by FPs and PCPs to primary and specialized care before the reform, and (3) how many patients with and without complex problems were treated by PCPs and in specialized care before the reform.

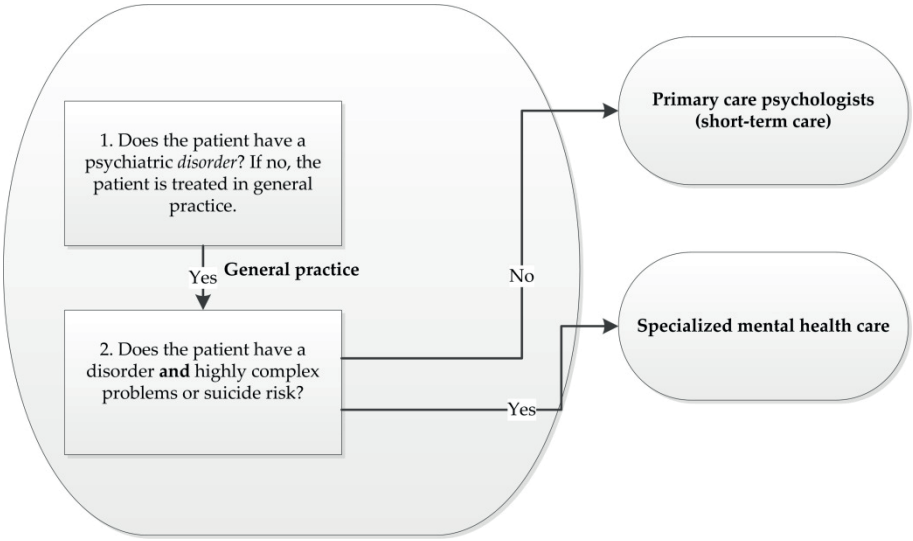


Figure 1 Mental health care in the Netherlands: referral rules

Methods

Data sources

In an observational, cross-sectional study, we extracted anonymized patient data from two national databases, to describe primary care, including family practices and primary care psychologists, and specialized mental health care in 2012.

Data on primary care were extracted from electronic health records of caregivers participating in the NIVEL Primary Care Database (NIVEL-PCD). All caregivers participating in the NIVEL-

PCD, including FPs and PCPs, routinely record care they deliver to patients. Family practices participating in the NIVEL-PCD are representative of Dutch family practices [20], although group practices and practices in non-urban areas are somewhat overrepresented compared to national numbers [21]. The patient populations of the family practices are representative of the Dutch population according to sex and age. Only data from practices with the most complete records were used for this study (n=180 practices; n=685,337 patients). Not all FPs keep complete records of referrals. A smaller number of practices were included in the analyses on referrals (n=25 practices; n=90,734 patients). Practices with complete referral records did not differ from other practices regarding practice type, degree of urbanization, or practice size.

In 2012, 543 primary care psychologists were participating in the NIVEL-PCD, providing care to 45,947 patients. The database covered 14.6% of all patients treated by primary care psychologists working in the Netherlands [22].

Data on specialized care were extracted from a national database for specialized care [23]. This database covers all caregivers, mostly psychiatrists and psychologists, working in Dutch specialized mental health care institutions, as well as solo operating entrepreneurs. Professionals working in specialized care are obliged by Dutch law to record all provided care that is paid for by health insurers in the national database. Therefore, virtually all Dutch patients treated in specialized mental health care were represented in this database.

Patient data

We extracted data on the number of seen or treated and referred patients and their diagnoses. To facilitate comparability between the three settings, all extracted numbers were converted to numbers of patients per 1,000 citizens based on the Dutch population number of 2012 [24].

FPs use the International Classification of Primary Care (ICPC) system to record diagnoses of patients within chapters of diseases during consultations. Within each ICPC chapter, a subdivision is made between symptoms (codes 01–29) and diseases or disorders

(codes 70–99), al- though the Z chapter (social problems) is limited to symptom codes. Only patients with at least one consultation at the family practice with a diagnosis concerning psychological problems (P chapter) or social problems (Z chapter) were included in the study. We distinguished between patients with a psychiatric disorder (P70–P99) and patients without a psychiatric disorder (psychological symptoms, P01–P29, or social problems, Z01–Z29).

PCPs and caregivers in specialized care record a DSM- IV diagnosis for each patient during treatment. Diagnostic assessment usually takes place during an intake phase, when a wide range of diagnostic instruments may be used. The DSM-IV is a globally used classification system for psychiatric disorders, covering five axes [25]. Axis 1 represents the primary disorder or psychopath- ology of the patient. Axes 2 to 4 represent comorbid, underlying, or related problems. Caregivers use axis 2 to report personality disorders, axis 3 for somatic diseases, axis 4 for psychosocial problems, and axis 5 for the level of (dis)functioning of the patient. The latter was not included in this study, as it was not available for all patients in specialized care. We used the axis 1 diagnosis to determine if patients of PCPs or in specialized care had a psychiatric disorder or not. Patients had problems of higher complexity if they had comorbid problems on axis 2 (a personality disorder), axis 3 (somatic problems), or axis 4 (psychosocial problems).

Results

Patients with and without disorders in three settings

Figure 2 shows the number of patients with and without psychiatric disorders in each of the three major settings of Dutch mental health care. FPs saw 131.0 patients with psychological problems per 1,000 citizens, mostly patients without psychiatric disorders (71.3%). FP patients often had psychological symptoms such as anxious feelings, or social problems such as problems with their partner (Supplementary Table S1).

PCPs and caregivers in specialized care treated a smaller number of patients compared to FPs, 18.7 and 43.7 patients per 1,000 citizens,

respectively. A considerable number of patients treated by primary care psychologists or in specialized care did not have a psychiatric disorder, 32.8% and 20.8%, respectively. In total, 15.3 patients without a disorder per 1,000 citizens were treated by primary care psychologists or in specialized care. These patients were for example diagnosed with other worries or problems, adjustment problems, or had no diagnosis (Supplementary Table S2 and Supplementary Table S3).

Referrals

Figure 3 shows how many patients with and without psychiatric disorders were referred by FPs and PCPs to primary and specialized care (Supplementary Table S4 shows exact numbers). FPs in total referred 16.1 patients with psychological and social problems per 1,000 citizens to primary or specialized care, which is 12.3% of all the FP patients with psychological and social problems. Over half of the referred FP patients (63.2%) did not have a psychiatric disorder. PCPs in total referred 2.2 patients per 1,000 citizens to primary and specialized care, which is 11.7% of all patients they treated. Of the referred PCP patients, around one fifth (22.4%) did not have a psychiatric disorder.

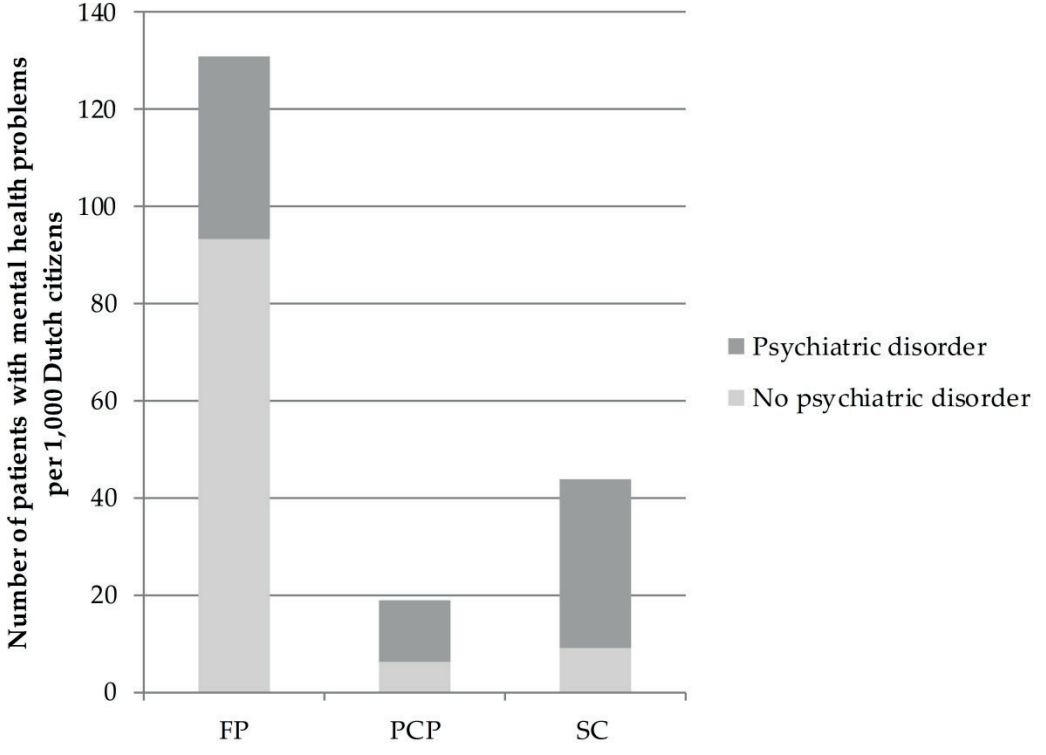


Figure 2 Number of patients with and without a psychiatric disorder in three settings per 1,000 Dutch citizens in 2012. Notes: FP=family practice, PCP=primary care psychologist, SC=specialized care.

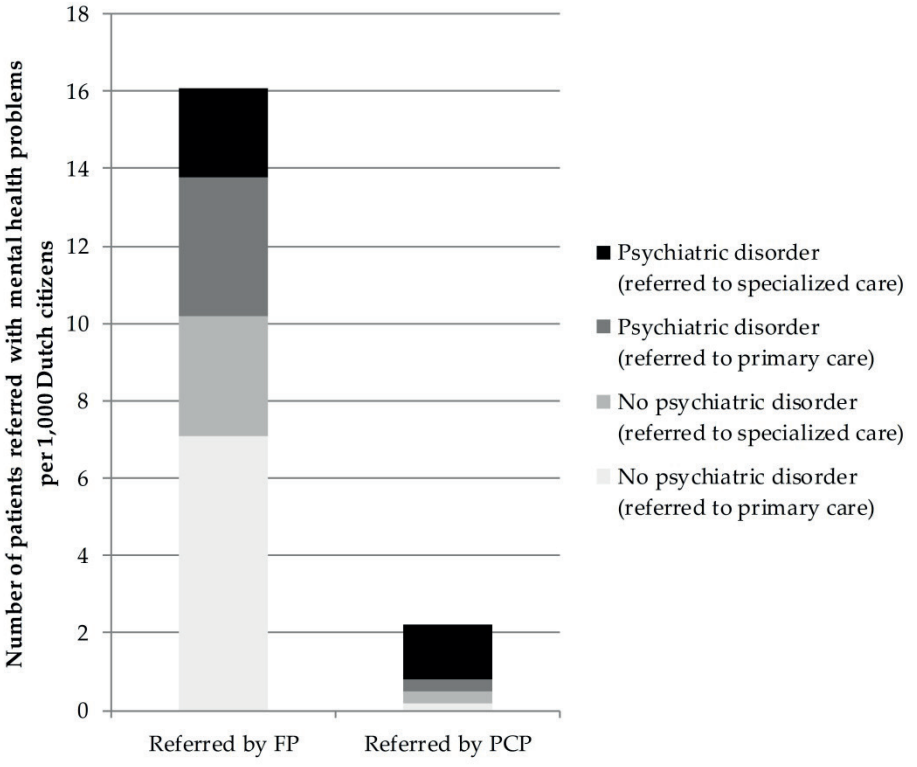


Figure 3 Number of patients referred with and without psychiatric disorder per 1,000 Dutch citizens in 2012. Notes: FP=family physician. PCP=primary care psychologist. Primary care: (other) FP, (other) PCP, or social work.

Complexity of problems

Figure 4 shows that many patients treated by PCPs had comorbidity, mostly a psychiatric disorder combined with psychosocial problems (78.3%), or somatic problems (75.9%). Only one in every twenty PCP patients had a combination of a psychiatric disorder and a personality disorder (4.5%). Most patients treated in specialized care had comorbidity as well; most patients with a disorder also had psychosocial problems (90.8%). Fewer patients treated in specialized care had a psychiatric dis- order combined with somatic problems (32.4%) or with a personality disorder (15.7%).

Discussion

Summary of findings

Prior to the recent reform of Dutch mental health care, a significant number of patients treated by PCPs (approximately one third) and in specialized care (approximately one fifth) did not have a diagnosed DSM-IV disorder. Over half of the patients with psychological and social problems referred by FPs to mental health professionals did not have a diagnosis of a psychiatric disorder. Most patients with a disorder in specialized care had complex problems, expressed by comorbidity on axis 4 of the DSM-IV (psychosocial problems). Comorbidity on axis 3 (somatic problems) or axis 2 (personality disorders) was less common.

Potential for substitution from PCPs and specialized care to family practice

The proportion of patients without a psychiatric disorder in mental health care observed in this study is in line with previous research [3–5]. If we evaluate this study as a baseline measure of the reform of the Dutch mental health care system, we expect that a part of the patients previously referred to and treated in mental health care from now on will receive treatment within family practices. Nurses with mental health expertise, who work in increasing numbers of family practices in the Netherlands, may be of crucial importance in the diagnostic assessment and treatment of those patients.

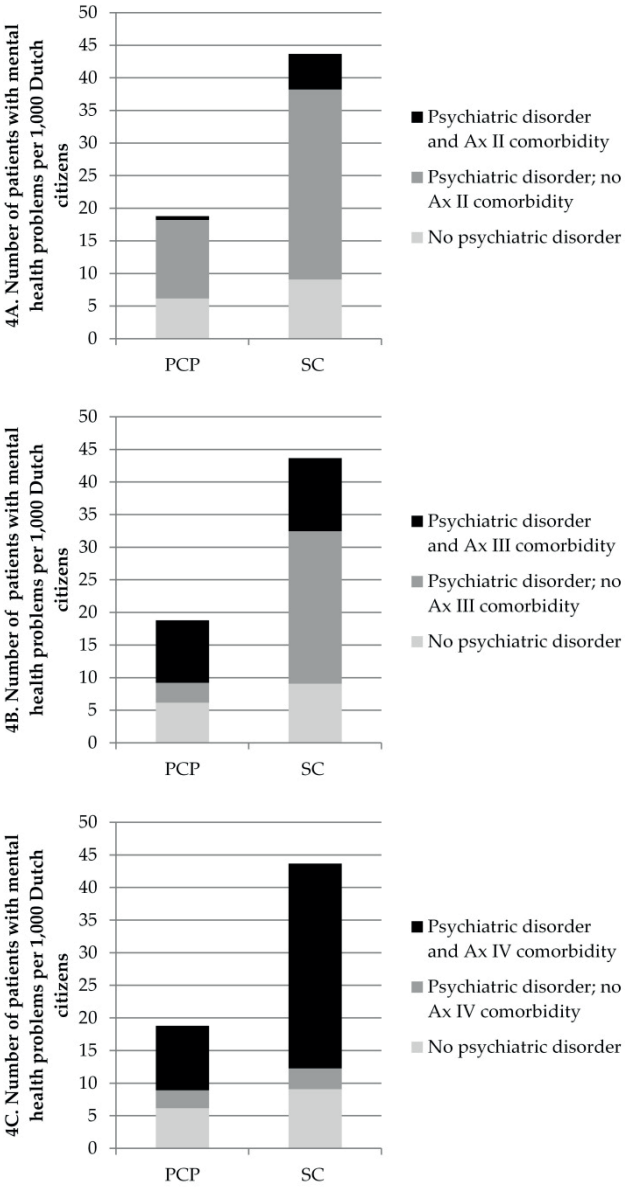


Figure 4 Number of patients with and without comorbidity in two settings per 1,000 Dutch citizens in 2012. Notes: PCP=primary care psychologist. SC=specialized care.

An apparent discrepancy was observed between the number of patients without a psychiatric disorder who were referred by FPs (over 60%) and the lower number of patients without a psychiatric disorder who were treated by PCPs and in specialized care (20.8% and 32.8%). It is highly plausible that (final) diagnostic assessment often takes place after referral, We have to consider the possibility that some of the patients might be falsely diagnosed after referral. Although the DSM-IV is highly useful, its limitations are widely debated, and it might stimulate overdiagnosis [26,27]. Moreover, the Dutch health insurance only covers PCP and specialist treatment for patients with a DSM-IV disorder, which may encourage overdiagnosis even further. Remarkably, FPs now also face the risk of overdiagnosis, as the new referral criteria make a psychiatric disorder a necessity for every referral to mental health care.

Some of the patients recently treated by mental health care professionals or referred by GPs may not have had a diagnosed psychiatric disorder, but they may certainly have been in need of treatment. Previous research showed that approximately half of the patients in mental health care had no psychiatric disorder, but showed other important indicators of need for treatment, such as multiple subthreshold disorders, a recent stressor, psychosocial problems, or suicidal behavior [3,4]. If we assume this is also true for the patients included in this study, the new referral criteria for FPs regarding psychiatric disorders could have an unwanted effect. Some patients, who are certainly in need of mental health care, but who do not meet formal criteria for a psychiatric disorder, may be deprived of appropriate treatment.

In either way, enabling and improving diagnostic assessment in family practices seems essential for substitution of mental health care. Good quality diagnostic assessment in family practice could facilitate the correct adoption of the new referral criteria. It could also improve the continuity of care from the patient's perspective. A screening instrument may be helpful, for example a symptom severity assessment [28]. MHNs could improve diagnostic assessment, both by performing it themselves or by indirectly improving FPs' knowledge and skills through collaboration.

Potential for substitution from specialized care to PCPs

We expect substitution towards PCPs to a lesser extent compared to substitution toward family practices, as most patients treated in specialized care with a disorder had at least comorbid psychosocial problems. However, it is debatable to what extent psychosocial problems genuinely represent a complicating factor, as they are often temporary and can be solved in a relatively straightforward way. Other comorbid diagnoses, such as personality disorders, were observed less frequently, but they are more likely to complicate treatment [29]. From this perspective, more potential for substitution from specialized care toward PCPs may exist than observed in this study.

Health care costs

Restraining costs was one the most important reasons for the recent Dutch mental health care reform. Our study indicates that, in the near future, at least some of the patients with mental health problems may be treated in (less expensive) primary care instead of in specialized care. This may result in a cost reduction. However, the recent Dutch reform might also have unintended cost effects. The accessibility of mental health care is likely to be improved, and some patients that might not have been treated at all before may now receive treatment in family practice. Moreover, it is unknown how many of the patients initially treated in family practice afterwards still need a referral to specialized care. Future research following patients through the different echelons of mental health care is needed to evaluate cost effects.

International relevance

The WHO states it is important to redirect funding to- wards community-based services, including the integration of mental health care into general health care settings [6]. Various health care system characteristics influence the role of the FP in mental health care [30,31], for ex- ample the referral system, FP workload and mental health expertise, financial regulations, and patient expectations. These factors vary strongly between countries, and influence a possible shift of mental health care from specialized care to primary care. Potential for substitution is likely to exist in other countries besides the Netherlands, as was shown by the numbers of patients without a psychiatric disorder

treated in mental health care [3,4], and by the numerous international studies evaluating the integration of mental health care into primary care [7–12]. FPs in the UK [32] and Canada [33] are collaborating with professionals similar to mental health nurses, which might enable substitution.

Strengths and limitations

As this is a descriptive study, we cannot draw any conclusions on causality. A major strength of this study is that we were able to combine two national databases, thereby including a very large number of patients in primary care and virtually all patients in specialized care. This study can function as a baseline measure for the recent Dutch mental health care reform.

Caregivers working in different settings vary in their skills to recognize and diagnose mental health problems. Caregivers working in different settings use different classification systems (ICPC and DSM-IV), which may complicate comparability between the settings. Previous research has shown that GPs do not always recognize psychological problems, or that they may be aware of mental health problems but do not label patients with a specific psychological diagnosis [34]. Only about half of all persons with mental disorders had contact with their GP in the last six months [35]. The diagnoses of persons who do not seek help are not coded and were thus not included in this study.

Professionals working in mental health care sometimes postpone giving a diagnosis. This could mean some of the patients included in our study may have been diagnosed later on. However, data were extracted a considerable amount of time after treatment (2014 vs. 2012). We categorized patients without a diagnosis as patients without a disorder, as we assume that the complaints of many of these patients were not severe enough to have led to an official diagnosis of a disorder within a decent amount of time. PCPs had the possibility of explicitly choosing between “no axis 1 disorder” or “diagnosis postponed”. The latter was only used for a one out of five patients without a diagnosis (Supplementary Table S2).

We were unfortunately not able to, besides the DSM-IV axis 2 to axis 4 comorbidity, include any other complicating factors, such as suicide risk. These factors were not routinely recorded by caregivers in

any setting.

Conclusions

A recent reform of Dutch mental health care, including new FP referral criteria, will likely lead to a considerable increase in patients with psychological or social problems that have to be treated within family practices. Enabling and improving diagnostic assessment and treatment in family practices seems essential for substitution of mental health care.

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Supplementary Table S1 Number of patients seen for psychological or social problems at Dutch family practices per 1,000 citizens in 2012

Diagnosis	Number of patients
Anxious feelings (1801)	9.16
Stress (1802)	5.11
Depressive feelings (1803)	5.85
Sleeping problems (1806)	13.57
Alcohol misuse (1815)	2.08
Tobacco misuse (1817)	5.47
Concentration/memory problems 1820)	3.83
Hyperactive child (1821)	3.78
Other worries child behavior (1822)	3.96
Learning problem (1824)	2.68
Other psychological symptoms	11.77
Work problems (2605)	2.46
Relational problem partner (2612)	4.92
Problem ill partner (2614)	2.07
Loss of partner (2615)	3.03
Other social problems	13.70
No psychiatric disorder (total)	**93.44**
Dementia/Alzheimer (1870)	2.41
Anxiety disorder (1874)	7.12
Depression (1876)	12.41
Neurasthenia (1878)	6.35
Personality disorder (1880)	1.43
Other psychiatric disorders	7.87
Psychiatric disorder (total)	**37.59**
Total	**131.03**

Notes: other psychological symptoms are all ICPC codes between P01 and P29 that are not shown in the table. Other social problems are all ICPC codes between Z01 and Z29 that are not shown in the table. Other psychiatric disorders are all ICPC codes between P70 and P99 that are not shown in the table.

Supplementary Table S2 Number of patients treated by primary care psychologists per 1,000 Dutch citizens in 2012

	Total	Axis 2		Axis 3		Axis 4	
Axis 1		**Comorbidity**	**No comorbidity**	**Comorbidity**	**No comorbidity**	**Comorbidity**	**No comorbidity**
No disorder	2.40	0.06	2.34	0.31	2.08	1.83	0.57
No diagnosis yet	0.68	0.01	0.67	0.11	0.56	0.54	0.13
Adjustment problems	0.92	0.03	0.90	0.67	0.71	0.78	0.14
Other worries or problems	2.17	0.05	2.11	0.35	1.82	1.85	0.31
No DSM-IV Axis 1 disorder (total)	**6.17**	**0.15**	**6.02**	**0.99**	**5.18**	**5.01**	**1.16**
Mood disorder	5.70	0.24	5.46	1.28	4.43	4.76	0.94
Anxiety disorder	4.21	0.19	4.02	0.92	3.29	2.96	1.25
Substance or alcohol related disorder	0.13	0.02	0.11	0.02	0.10	0.11	0.01
Dementia	0.03	0.00	0.02	0.02	0.01	0.02	0.01
Somatoform disorder	1.03	0.03	1.01	0.44	0.59	0.83	0.20

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-Supplementary Table S2 continued –

	Total	Axis 2		Axis 3		Axis 4	
Axis 1		**Comorbidity**	**No comorbidity**	**Comorbidity**	**No comorbidity**	**Comorbidity**	**No comorbidity**
Eating disorder	0.12	0.01	0.11	0.04	0.08	0.07	0.04
Other disorder	1.41	0.10	1.32	0.33	1.08	1.14	0.28
DSM-IV Axis 1 disorder (total)	**12.63**	**0.57**	**12.05**	**3.04**	**9.59**	**9.89**	**2.74**
Total	**18.79**	**0.72**	**18.07**	**4.03**	**14.76**	**14.90**	**3.90**

Notes: other disorder is a sexual or gender identity disorder, dissociative disorder, sleeping disorder, impulse control disorder, a disorder as a result of a somatic illness, or disorder not further specified.

Supplementary Table S3 Number of patients treated in secondary care per 1,000 Dutch citizens in 2012

	Total	Axis 2		Axis 3		Axis 4	
Axis 1		**Comorbidity**	**No comorbidity**	**Comorbidity**	**No comorbidity**	**Comorbidity**	**No comorbidity**
No diagnosis	4.00	0.03	3.97	0.09	3.92	0.26	3.74
Adjustment problems	1.35	0.21	1.14	0.44	0.91	1.24	0.11
Other worries or problems	3.73	0.45	3.28	0.73	3.00	3.49	0.24
No DSM-IV Axis 1 disorder (total)	**9.08**	**0.69**	**8.39**	**1.26**	**7.82**	**4.98**	**4.10**
Depressive disorder	7.81	1.80	6.00	2.97	4.83	7.22	0.59
Bipolar disorder	1.73	0.36	1.37	0.61	1.13	1.33	0.40
Anxiety disorder	5.55	1.19	4.36	1.74	3.81	4.88	0.67
Psychotic disorder including schizophrenia	3.34	0.49	2.85	1.06	2.28	2.95	0.39
Substance or alcohol related disorders	3.30	0.66	2.64	1.01	2.29	3.21	0.09
Dementia	1.65	0.09	1.56	1.36	0.28	1.42	0.22
Somatoform disorder	1.13	0.17	0.96	0.48	0.65	0.96	0.17
Eating disorder	0.60	0.09	0.51	0.35	0.25	0.48	0.11

-continued-

-Supplementary Table S3 continued-

	Total	Axis 2		Axis 3		Axis 4	
Axis 1		Comorbidity	No comorbidity	Comorbidity	No comorbidity	Comorbidity	No comorbidity
Developmental or children disorder	8.98	0.35	8.63	1.26	7.72	7.99	0.98
Other disorder	1.07	0.23	0.84	0.38	0.69	0.95	0.12
DSM-IV Axis 1 disorder (total)	**34.59**	**5.44**	**29.15**	**11.21**	**23.37**	**31.40**	**3.19**
Total	**43.67**	**6.13**	**37.54**	**12.47**	**31.20**	**36.38**	**7.28**

Notes: other disorder is a dissociative disorder, simulated disorder, sexual or gender identity disorder, sleeping disorder, impulse control disorder, or a disorder caused by a somatic illness. Adjustment problems (included in the DSM-IV), often triggered by psychosocial circumstances or not complex, do not need specialist treatment according to the Dutch government. Treatment for adjustment problems is no longer covered by the basic insurance in the Netherlands since 2013. Therefore, we categorized patients with adjustment problems within the group of patients with no psychiatric disorders, who should receive treatment within family practice.

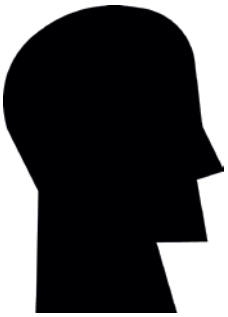
Supplementary Table S4 Number of patients referred by FPs and PCPs per 1,000 Dutch citizens in 2012

		By FPs	By PCPs
To primary care	No psychiatric disorder	7.10	0.17
	Psychiatric disorder	3.58	0.32
	Total	**10.68**	**0.49**
To secondary care	No psychiatric disorder	3.08	0.32
	Psychiatric disorder	2.34	1.38
	Total	**5.41**	**1.71**
Total	No psychiatric disorder	10.18	0.49
	Psychiatric disorder	5.92	1.70
	Total	**16.10**	**2.20**

Notes: FPs=family physicians. PCPs=primary care psychologists. Primary care: (other) FP, (other) PCP, or social work.

3

Consultations in general practices with and without mental health nurses: an observational study from 2010 to 2014



Magnée T, de Beurs DP, de Bakker DH, Verhaak PF. Consultations in general practices with and without mental health nurses: an observational study from 2010 to 2014. BMJ Open. 2016;6(7),e011579.
Dit artikel is ook in het Nederlands verschenen als: Verlicht de POH-GGZ de werkdruk van de huisarts? Nederlands Tijdschrift voor Geneeskunde. 2016;160(0):D983.

Abstract

Objectives
To investigate care for patients with psychological or social problems provided by mental health nurses (MHNs), and by general practitioners (GPs) with and without MHNs.

Design
An observational study with consultations recorded by GPs and MHNs.

Setting
Data were routinely recorded in 161–338 Dutch general practices between 2010 and 2014. Participants: All patients registered at participating general practices were included: 624,477 patients in 2010 to 1,392,187 patients in 2014.

Outcome measures
We used logistic and Poisson multilevel regression models to test whether GPs recorded more patients with at least one consultation for psychological or social problems and to analyse the number of consultations over a 5-year time period. We examined the additional effect of an MHN in a practice, and tested which patient characteristics predicted transferral from GPs to MHNs.

Results
Increasing numbers of patients with psychological or social problems visit general practices. Increasing numbers of GPs collaborate with an MHN. GPs working in practices with an MHN record as many consultations per patient as GPs without an MHN, but they record slightly more patients with psychological or social problems (OR=1.05; 95% CI 1.02 to 1.08). MHNs most often treat adult female patients with common psychological symptoms such as depressive feelings.

Conclusions
MHNs do not seem to replace GP care, but mainly provide additional long consultations. Future research should study to what extent collaboration with an MHN prevents patients from needing specialised mental health care.

Introduction

Mental disorders are highly common in developed countries and account for a large burden of disease [1]. The rising costs of mental healthcare are a major reason for concern for many governments [2]. Therefore, the WHO underlines the importance of strengthening primary mental healthcare, where good quality services are highly accessible and relatively inexpensive [3]. However, many general practitioners (GPs) do not have the resources, time and expertise to treat all patients with psychological or social problems themselves [2]. As a result, increasing numbers of patients are treated in specialised care [4,5].

In 2014, the Dutch government introduced a reform of the Dutch mental healthcare system, to stimulate a shift of patients from specialised to primary care. Since then, GPs can only refer patients with psychiatric disorders according to DSM-IV criteria (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition [6]) to other professionals working in mental healthcare. All patients without a psychiatric disorder should be treated within general practice.

A promising method to prepare general practice for this intensified role in the mental healthcare system is the shifting of care from GPs to nurses. Increasing numbers of GPs work together with a nurse with expertise in mental health: a mental health nurse (MHN). Since 2014, a GP working in an average size practice can be supported by an MHN for ~ 1 day a week. Previous research on shifting care from doctors to nurses has focused mainly on patients with somatic diseases. Shifting care to nurses may reduce the increasing workload of GPs [7], improve the accessibility of care [8] and reduce the number of patients who need referral to specialised care. Patients are satisfied when they receive care from nurses instead of from doctors [9]. Nurses working in general practice are probably more cost-effective than GPs [7,10,11]. Besides, nurses in general practice can treat certain patients who otherwise would have been treated in more expensive specialised care [12].

Dutch MHNs received higher vocational training in nursing or psychology, and their main tasks are to perform diagnostic research, to improve the quality of the referral to other mental health caregivers and to deliver short-term care (such as counselling) to patients with psychological symptoms or social problems. MHNs work under the supervision of the GP.

In general, the GP decides after a first consultation if a patient should visit the MHN. GPs can also decide to treat patients themselves, or refer patients to specialised mental healthcare. Treatment of (mild) psychological or social problems provided in primary care seems effective, more accessible than treatment in specialised care and leads to satisfaction among patients and caregivers [13-16].

It is not clear to what extent GP care is replaced by MHN care. It is plausible that GPs collaborating with an MHN see a smaller number of patients with psychological or social problems themselves, or use fewer or shorter consultations per patient. On the other hand, is it possible that nurses generate an extra demand for care [7] or uncover needs previously unmet by the GP, and deliver additional consultations to patients with psychological or social problems?

The objective of this study was to examine a possible shift of care from GPs to MHNs between 2010 and 2014. Using a primary care database, we investigated (1) how many patients with psychological problems or social problems were recorded by GPs and MHNs yearly, (2) how many consultations (total and long) were recorded per patient by GPs and MHNs, (3) if the total number of patients and consultations changed over the years, (4) if differences between GPs working with an MHN and GPs without an MHN existed and (5) which patients were most often treated by the MHN after they visited the GP.

Methods

Database

In an observational study, anonymised data from 2010 to 2014 from electronic health records of general practices participating in the NIVEL Primary Care Database (NIVEL-PCD) [17] were analysed. All caregivers participating in NIVEL-PCD routinely record care they deliver to their patients. NIVEL-PCD has a dynamic nature; the number of participating general practices varies over time and thus varied over our study period. In general, the number of participating practices increases every year, but practices can also discontinue participation. The general practices (n=161 in 2010 to n=338 in 2014; see Supplementary Tables S1-S5) and their patient populations are representative of Dutch general practices and the Dutch

population, although group practices and practices in non-urban areas are somewhat over-represented compared with national numbers [18]. Only practices which met a quality criterion for recording (≥70% complete) were included in this study.

Data

In the Netherlands, all (17 million) citizens are registered at a general practice. All patients registered at participating practices were included in the study (n=624,477 in 2010 to n=1,392,187 in 2014; see Supplementary Tables S1-S5 for the age and gender of patients). Dutch GPs receive a capitation fee for each registered patient, and receive additional fees for recorded consultations. Dutch GPs and MHNs use their own standardised codes to record standard and long (over 20 minutes) consultations with patients. They record at least one and up to three diagnoses according to the International Classification of Primary Care (ICPC) system per consultation, based on their clinical evaluation. Only consultations with at least one diagnosis concerning psychological or social problems were selected for this study, including all psychological problems (psychological symptoms or disorders) and social problems (Table 1).

Table 1 Psychological or social problems included in the study, coded with the International Classification of Primary Care (ICPC) system

Type of psychological or social problems	ICPC code
Psychological symptoms	P01-P29, for example, P01—anxious feelings
Psychological disorders	P70-P99, for example, P74—anxiety disorder
Social problems	Z01-Z29, for example, Z12—relational problem with partner

The recorded consultations were office consultations (standard or long), home consultations (standard or long), and telephone and email consultations (standard only). These consultations cover the majority of GP work regarding direct care to patients. When a patient had multiple recorded psychological or social diagnoses at one consultation, the first diagnosis overruled the second or third diagnosis, and the second over-

ruled the third. When a patient attended multiple consultations concerning psychological or social problems in a year, the diagnosis of the last (GP or MHN) consultation was regarded as the main diagnosis of the patient. This was assumed to be the most adequate method, as psychological diagnostics usually take place over multiple consultations. Most patients visited the GP for only one type of problems during a year. Gender and age were recorded for all patients.

Data on practice level were available from the NIVEL-PCD database administration. Degree of urbanisation was categorised as very high (>2,500 addresses per km^2), high (1,500–2,500 addresses per km^2), medium (1,000–1,500 addresses per km^2), low (500–1,000 addresses per km^2) or very low (<500 addresses per km^2). Practice type was defined as solo (one GP), duo (two GPs) or group practice (GP collaborating with at least two other GPs or with other primary care professionals). Practice size was categorised as small (<2500 enlisted patients), medium (2,500–3,499 patients) or large (≥3,500 patients). Practices with at least 25 recorded consultations by MHNs use in a given year were categorised as practices with an MHN. Practices with an MHN were more often group practices, located in urban areas, and had a somewhat younger patient population (see Supplementary Tables S1-S5); we corrected analyses for these variables.

Analyses

We provide basic descriptive statistics. We report how many GPs worked with an MHN per year. Next, we present the average number of consultations recorded by GPs and MHNs for psychological or social problems.

We analysed three different dependent variables: (1) attending at least one consultation for psychological or social problems in a given year per patient (no or yes), (2) the total number of consultations for psychological or social problems per year per patient and (3) the number of long consultations for psychological or social problems per year per patient. Six analyses were per- formed in total, as the three outcome measures were analysed separately for GPs and MHNs. Associations between consultations for psychological or social problems and patient and practice characteristics were analysed with multilevel generalised repeated measurements regression analyses using a model with three hierarchical levels (measurement, patient and general practice) to account for clustered data. At

the patient level, a full, unstructured variance/covariance matrix for the years was fitted to control for the autocorrelation between years within patients. At the practice level, only a yearly between practice variance was fitted. Adding covariances made the models unstable, because only a limited number of practices provided data for several years. The intraclass correlation coefficient (ICC) at the practice level was calculated for each year to estimate variation between practices [19]. Although the ICC is difficult to interpret in logistic models, it does allow us to compare the level of between practice variation over the years. Binary outcomes were analysed using logistic regression and count outcomes with Poisson regression.

While analysing recorded GP consultations, we were interested in the effect of year and the effect of the presence of an MHN at a practice. Regarding MHN consultations, we were interested in the effect of year and patient characteristics (ICPC diagnosis, age, and gender of patients). We wanted to compare patients exclusively visiting the GP with patients also visiting the MHN. Therefore, while analysing MHN consultations, we only included patients who visited the GP at least once in a given year for psychological or social problems. Thereby, we could compare GP patients with MHN patients. All analyses were corrected for degree of urbanisation of practice location, practice type, practice size, gender and age of patients, and the part of the year that patients were registered at a practice. The significance level was set at <0.05. All analyses were performed using MLwiN V.2.30.

Results

Patients treated by GPs and MHNs

Between 2010 and 2014, the percentage of general practices with an MHN increased from 20% to 83% (Supplementary Tables S1-S5). Figure 1 shows that in 2014, both GPs (Table 2A) and MHNs (Table 3A) treated an increased number of patients with psychological or social problems compared with 2010. GPs in practice with an MHN treated slightly more patients with psychological or social problems than GPs without an MHN (OR=1.05; 95% CI 1.02 to 1.08). The intraclass correlation at the practice level ranged from 1.5% in 2010 to 1.2% in 2014.

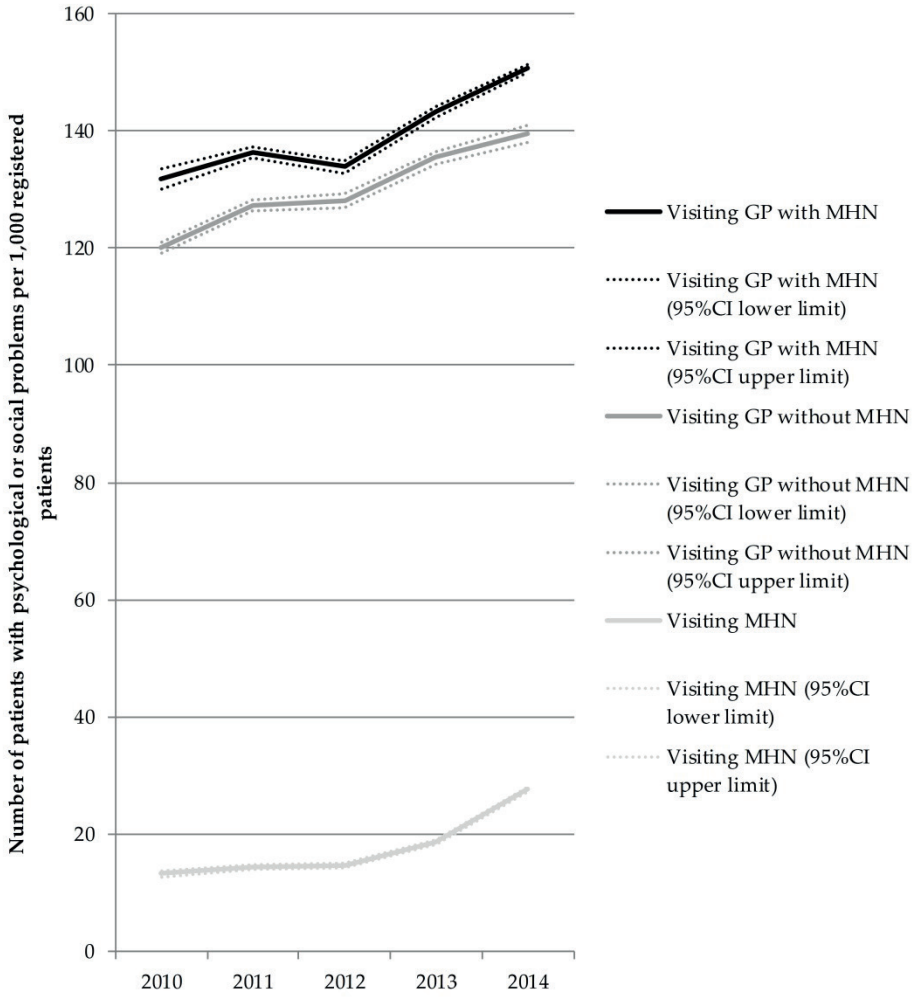


Figure 1 Numbers of patients with at least one consultation for psychological or social problems at Dutch GPs and MHNs per 1,000 registered patients between 2010 and 2014 (crude rates)

Number of consultations

Yearly, patients with psychological or social problems had more than two GP consultations and relatively few long GP consultations (Figure 2). Patients who visited the MHN had around three consultations per year and especially long consultations. Between 2010 and 2014, the number of consultations per patient increased for both GPs (Table 2B) and MHNs (Table 3B). The number of long GP consultations (Table 2C) and long MHN consultations (Table 3C) increased as well. Overall, we found no differences in the number of total or long GP consultations used per patient in general practices with or without an MHN (Table 2B,Table 2C).

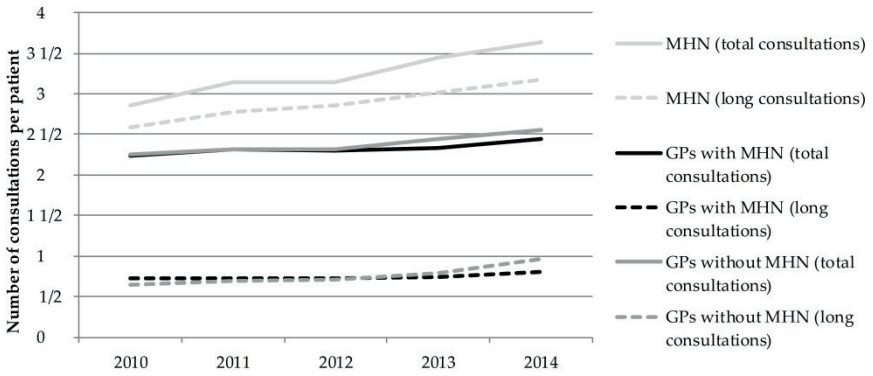


Figure 2 Mean number of consultations per patient with psychological or social problems seen by Dutch GPs and MHNs between 2010 and 2014 (crude rates)

Table 2 Statistics for multivariate multi-level tests of the effects of time and practice and patient characteristics on consultations by Dutch general practitioners

	(A) Having at least one GP consultation for psychological or social problems per patient per year (no/yes)		**(B) Number of GP consultations for psychological or social problems per patient per year**		**(C) Number of long GP consultations for psychological or social problems per patient per year**	
Number of observations in analyses	n=4,389,048 (all GP patients)		n=594,231 (only patients with at least one GP consultation for psychosocial problems)		n=594,231 (only patients with at least one GP consultation for psychosocial problems)	
	OR	95% CI	RR	95% CI	RR	95% CI
Year						
2010 (reference)						
2011	1.05	1.01-1.11	1.03	1.00-1.05	1.02	0.96-1.09
2012	1.07	1.02-1.13	1.00	0.98-1.02	1.03	0.96-1.10
2013	1.15	1.10-1.21	1.05	1.03-1.08	1.07	1.00-1.14
2014	1.23	1.17-1.28	1.12	1.09-1.15	1.13	1.06-1.21
Practice characteristics						
Employment of MHN						
No (reference)						
Yes	1.05	1.02-1.08	1.00	0.98-1.02	1.01	0.97-1.06
Practice type						
Solo (reference)						
Duo	1.05	1.01-1.09	1.02	1.00-1.05	1.09	1.02-1.16
Group	1.00	0.96-1.03	1.02	0.99-1.04	1.04	0.98-1.10

-continued-

-Table 2 continued-

	(A) Having at least one GP consultation for psychological or social problems per patient per year (no/yes)		(B) Number of GP consultations for psychological or social problems per patient per year		(C) Number of long GP consultations for psychological or social problems per patient per year	
Number of observations in analyses	n=4,389,048 (all GP patients)		n=594,231 (only patients with at least one GP consultation for psychosocial problems)		n=594,231 (only patients with at least one GP consultation for psychosocial problems)	
	OR	95% CI	RR	95% CI	RR	95% CI
Degree of urbanization (%)						
Very high (reference)						
High	0.99	0.95-1.03	1.04	1.02-1.07	1.04	0.98-1.10
Medium	0.90	0.86-0.93	1.04	1.01-1.06	1.13	1.06-1.21
Low	0.77	0.74-0.80	1.05	1.02-1.08	1.20	1.12-1.28
Very low	0.81	0.77-0.85	1.08	1.05-1.11	1.24	1.15-1.33
Practice size						
Small (reference)						
Medium	1.01	0.97-1.04	1.03	1.00-1.05	1.00	0.94-1.06
Large	1.03	0.99-1.07	1.03	1.01-1.06	1.06	0.99-1.13
Patient characteristics						
Sex						
Male (reference)						
Female	1.43	1.42-1.44	1.07	1.05-1.08	1.13	1.10-1.15

-continued-

-Table 2 continued-

	(A) Having at least one GP consultation for psychological or social problems per patient per year (no/yes)		(B) Number of GP consultations for psychological or social problems per patient per year		(C) Number of long GP consultations for psychological or social problems per patient per year	
Number of observations in analyses	n=4,389,048 (all GP patients)		n=594,231 (only patients with at least one GP consultation for psychosocial problems)		n=594,231 (only patients with at least one GP consultation for psychosocial problems)	
	OR	95% CI	RR	95% CI	RR	95% CI
Age category						
0-19 years (reference)						
19-44 years	1.68	1.67-1.70	1.33	1.31-1.36	1.96	1.88-2.04
45-64 years	1.94	1.92-1.96	1.41	1.38-1.44	2.13	2.04-2.22
>65 years	2.36	2.33-2.39	1.59	1.55-1.62	2.06	1.98-2.16

Notes: GP=general practitioner. OR=odds ratio. RR=risk ratio. 95%CI=95% confidence interval. An OR higher than 1.0 reflects an increased chance of having at least one consultation, compared to the reference group. An RR higher than 1.0 reflects the chance of having more than one consultation compared to the reference group.

Patients visiting the MHN

Some of the GP patients with psychological or social problems were more likely to have at least one MHN consultation (Table 3A): patients with depressive feelings, neurasthenia, relational problems with a partner, stress, anxious feelings, relational problems with a child or depression, than patients with problems categorised as 'other psychological symptoms' (Table 3A). Females were more likely to have at least one MHN consultation than males. Older patients, especially 19–44 years old, were more likely to have at least one MHN consultation than children.

Other GP patients were less likely to have at least one MHN consultation in comparison to patients with other psychological symptoms: patients diagnosed with tobacco abuse, learning problems, dementia, sleeping problems, concentration or memory problems, alcohol abuse, child hyperactivity, other psychological disorders, loss of a partner, an ill partner, other child behavioural problems or other social problems.

In general, patient characteristics that increased the chance of having at least one MHN consultation also increased the likeliness of having a higher number of consultations for patients with at least one MHN consultation. For example, females, adult patients and patients with depressive feelings or neurasthenia who visited the MHN were more likely to have a higher number of total (Table 3B) or long MHN consultations (Table 3C).

Table 3 Statistics for multivariate multi-level tests of the effects of time and practice and patient characteristics on consultations by Dutch mental health nurses

	(A) Having at least one MHN consultation per patient per year (no/yes)		**(B) Number of MHN consultations per patient per year**		**(C) Number of long MHN consultations per patient per year**	
Number of observations in analyses	n=372,281 (only patients with psychological or social problems)		n=53,735 (only patients with at least one MHN consultation)		n=53,735 (only patients with at least one MHN consultation)	
	OR	95% CI	RR	95% CI	RR	95% CI
Year						
2010 (reference)						
2011	1.18	0.97-1.44	1.27	1.05-1.53	1.24	1.03-1.51
2012	1.16	0.95-1.41	1.21	1.00-1.47	1.20	0.99-1.47
2013	1.44	1.20-1.73	1.62	1.35-1.94	1.56	1.30-1.88
2014	2.03	1.70-2.43	2.23	1.87-2.65	2.15	1.80-2.56
Practice characteristics						
Practice type						
Solo (reference)						
Duo	1.02	0.89-1.17	0.98	0.86-1.12	0.99	0.87-1.13
Group	0.96	0.86-1.08	1.01	0.90-1.13	0.99	0.88-1.11

-continued-

-Table 3 continued-

	(A) Having at least one MHN consultation per patient per year (no/yes)		**(B) Number of MHN consultations per patient per year**		**(C) Number of long MHN consultations per patient per year**	
Number of observations in analyses	n=372,281 (only patients with psychological or social problems)		n=53,735 (only patients with at least one MHN consultation)		n=53,735 (only patients with at least one MHN consultation)	
	OR	95% CI	RR	95% CI	RR	95% CI
Degree of urbanization (%)						
Very high (reference)						
High	1.14	1.01-1.28	1.12	1.00-1.26	1.14	1.02-1.28
Medium	0.91	0.80-1.03	0.95	0.84-1.08	0.98	0.87-1.11
Low	1.17	1.03-1.32	1.10	0.97-1.24	1.14	1.01-1.28
Very low	1.19	1.02-1.39	1.16	1.00-1.35	1.18	1.01-1.36
Practice size						
Small (reference)						
Medium	0.89	0.79-1.00	0.88	0.79-0.99	0.90	0.80-1.01
Large	0.85	0.76-0.97	0.88	0.78-0.99	0.88	0.78-0.99

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-Table 3 continued-

	(A) Having at least one MHN consultation per patient per year (no/yes)		(B) Number of MHN consultations per patient per year		(C) Number of long MHN consultations per patient per year	
Number of observations in analyses	n=372,281 (only patients with psychological or social problems)		n=53,735 (only patients with at least one MHN consultation)		n=53,735 (only patients with at least one MHN consultation)	
	OR	95% CI	RR	95% CI	RR	95% CI
Patient characteristics						
Sex						
Male (reference)						
Female	1.15	1.13-1.18	1.20	1.16-1.24	1.20	1.16-1.25
Age category						
0-19 years (reference)						
19-44 years	2.55	2.45-2.67	2.36	2.19-2.54	2.45	2.26-2.66
45-64 years	2.05	1.96-2.15	2.24	2.07-2.41	2.36	2.17-2.57
>65 years	1.09	1.04-1.15	1.26	1.16-1.37	1.29	1.17-1.41

-continued-

-Table 3 continued-

	(A) Having at least one MHN consultation per patient per year (no/yes)		**(B) Number of MHN consultations per patient per year**		**(C) Number of long MHN consultations per patient per year**	
Number of observations in analyses	n=372,281 (only patients with psychological or social problems)		n=53,735 (only patients with at least one MHN consultation)		n=53,735 (only patients with at least one MHN consultation)	
	OR	95% CI	RR	95% CI	RR	95% CI
Symptoms or diagnose (ICPC)						
Other psychological symptoms (reference)						
Anxious feelings (1801)	1.28	1.22-1.33	1.15	1.08-1.23	1.15	1.07-1.24
Stress (1802)	1.57	1.49-1.65	1.32	1.23-1.43	1.32	1.22-1.42
Depressive feelings (1803)	2.26	2.16-2.37	1.81	1.69-1.94	1.82	1.70-1.96
Sleeping problems (1806)	0.19	0.18-0.20	0.19	0.17-0.21	0.18	0.16-0.21
Alcohol misuse (1815)	0.41	0.37-0.46	0.48	0.41-0.57	0.45	0.38-0.54
Tobacco misuse (1817)	0.07	0.06-0.08	0.07	0.06-0.09	0.06	0.04-0.08
Concentration/memory problems (1820)	0.35	0.32-0.39	0.34	0.29-0.41	0.30	0.25-0.37
Hyperactive child (1821)	0.44	0.40-0.48	0.45	0.39-0.52	0.41	0.35-0.49
Other worries child behavior (1822)	0.81	0.75-0.88	0.69	0.60-0.78	0.65	0.56-0.75

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-Table 3 continued-

	(A) Having at least one MHN consultation per patient per year (no/yes)		**(B) Number of MHN consultations per patient per year**		**(C) Number of long MHN consultations per patient per year**	
Number of observations in analyses	n=372,281 (only patients with psychological or social problems)		n=53,735 (only patients with at least one MHN consultation)		n=53,735 (only patients with at least one MHN consultation)	
	OR	95% CI	RR	95% CI	RR	95% CI
Learning problem (1824)	0.10	0.08-0.12	0.11	0.07-0.16	0.09	0.06-0.15
Dementia/Alzheimer (1870)	0.18	0.15-0.22	0.19	0.14-0.26	0.15	0.11-0.22
Anxiety disorder (1874)	1.01	0.96-1.06	1.06	0.98-1.14	1.03	0.95-1.11
Depression (1876)	1.21	1.15-1.26	1.30	1.22-1.39	1.28	1.20-1.37
Neurasthenia (1878)	2.00	1.91-2.10	1.64	1.53-1.76	1.68	1.56-1.81
Personality disorder (1880)	0.97	0.89-1.06	1.12	0.99-1.27	1.06	0.93-1.21
Other psychological disorders	0.56	0.53-0.59	0.61	0.56-0.67	0.58	0.52-0.63
Work problems (2605)	1.03	0.95-1.11	0.93	0.83-1.05	0.94	0.84-1.07
Partner/relational problem (2612)	1.65	1.56-1.73	1.34	1.24-1.44	1.34	1.23-1.45

-continued-

-Table 3 continued-

	(A) Having at least one MHN consultation per patient per year (no/yes)		**(B) Number of MHN consultations per patient per year**		**(C) Number of long MHN consultations per patient per year**	
Number of observations in analyses	n=372,281 (only patients with psychological or social problems)		n=53,735 (only patients with at least one MHN consultation)		n=53,735 (only patients with at least one MHN consultation)	
	OR	95% CI	RR	95% CI	RR	95% CI
Ill partner (2614)	0.69	0.63-0.76	0.69	0.60-0.80	0.70	0.60-0.81
Loss of partner (2615)	0.59	0.54-0.65	0.67	0.58-0.77	0.67	0.58-0.77
Child/relational problem (2616)	1.28	1.16-1.41	1.07	0.92-1.23	1.05	0.90-1.22
Other social problems	0.86	0.82-0.89	0.84	0.79-0.90	0.83	0.77-0.89

Notes: MHN=mental health nurse. OR=odds ratio. RR=risk ratio. 95%CI=95% confidence interval. An OR higher than 1.0 reflects an increased chance of having at least one consultation, compared to the reference group. An RR higher than 1.0 reflects the chance of having more than one consultation compared to the reference group. Not all ICPC codes in the three diagnosis categories (psychological symptoms, psychological disorders, and social problems) are shown in the table. Some diagnoses were less frequent and combined to limit the number of variables in the model. Other psychological symptoms: all ICPC codes between P01 and P29 not shown in table. Other psychological disorders: all ICPC codes between P70 and P99 not shown in table. Other social problems: all ICPC codes between Z01 and Z29 not shown in table. "Other psychological symptoms" was chosen as the reference category for this variable because of two reasons: firstly, because the group was relatively large which was useful for analyses, and secondly, because patients in this group were represented in an equal rate at GP and MHN.

Discussion

Principal findings

Between 2010 and 2014, the percentage of Dutch general practices with an MHN increased considerably from 20% to 83%. MHNs as well as GPs record increasing numbers of patients with psychological or social problems, as well as an increasing number of consultations per patient. The availability of an MHN at a practice is associated with a slightly larger number of patients seen by the GP, but not with a lower number of GP consultations per patient. The chance on MHN treatment was highest for female adult patients with common psychological or social problems, such as depressive or anxious feelings, neurasthenia, stress or relational problems.

Strengths and weaknesses

Since this is a descriptive study, we cannot draw any conclusions on causality. A major strength of this study is that we were able to analyse data from 5 years for a very large sample of patients. Most practices that participated in NIVEL-PCD do so for several years. GPs only receive fees for their services when they record the care they provide, are trained in coding and record according to a national guideline. Only data from practices with the most complete records were used for analyses. An important limitation of our study is the presumption that mental health problems are often under-reported in patient health records. When mental health problems appear together with chronic illness or vague somatic symptoms, as they often do, the GP is likely to record a somatic problem. Therefore, our results probably under- estimate the absolute number of patients with psychological or social problems in general practice. Another important limitation is that GPs vary in screening skills and in assessment methods of mental health problems, resulting in between practice variation. By adding a random intercept at the practice level in our analysis, we controlled for any influence of practice variation. Also, since the ICC remained stable over the years (between 1.5% and 1.2%), we argue that it is legitimate to compare the records over the years, as the bias due to differences in screening and assessment methods seems to be similar for each year. Unfortunately, referral records to specialised care were not complete and thus could not be used for this study.

Group practices were modestly overrepresented in our study. Since

group practices more often have resources to employ an MHN compared with solo GP practices, this could mean our data showed a small overestimation of practices with an MHN. On the other hand, practices in urban locations, which collaborate more often with an MHN, were under-represented. The percentage of practices with an MHN that we found was comparable to the number from a national GP survey [20].

We used recorded consultations to determine if a practice had employed an MHN or not in a given year. Theoretically, this means that practices we categorised as a practice with MHN could have employed the nurse on the last day of that year. However, since 2011, most practices (around 75%) employed the MHN since January (see Supplementary Tables S1-S5). In 2010, this number was lower (44%), but almost 70% of all practices employed the MHN for at least half a year. We assumed that no or very few practices decided to stop the employment of an MHN during the year. Since many practices employed an MHN for several consecutive years, they were highly likely to be representative of practices with an 'integrated' MHN.

Interpretation of findings and comparison with previous literature

Since the incidence of mental disorders has been stable for the past decade in the Netherlands [21], the observed increase in patients visiting the GP for psychological or social problems may reflect an increasing demand for treatment. This increase seems specific for patients with psychological or social problems, as the number of patients visiting the GP in general or with somatic symptoms seems to be relatively stable over the years [22,23].

Previous research showed that practice nurses are able to take over care from physicians regarding various chronic somatic diseases [7,9,11,12]. However, care for patients with psychological or social problems does not (yet) seem to shift from GPs to MHNs, as Dutch GPs working with an MHN use as many (long) consultations per patient as GPs without an MHN. In fact, GPs who work together with an MHN seem to see more patients with psychological or social problems than GPs without an MHN. GPs who employ an MHN are perhaps more interested in mental health or have improved skills to recognise psychological problems. Often, patients present (vague) somatic problems rather than psychological problems as their primary problem [24,25], and GPs vary in their ability to detect psychological or social problems during consultations [26]. The presence of an MHN in a general practice may help to make GPs more aware of the importance of recording psychological or social problems during

consultations.

The observed increase in number of patients and consultations over time probably reflects an increased capacity in general practice. The MHN is often present for ~1 day a week, and the number of reimbursed working hours for the MHN was slowly increased over the past few years. This increased capacity may influence GPs' behaviour; the possibility to offer short psychological treatment within their own practice may increase their likeliness to record psychological or social problems. In this way, MHNs may contribute to improved accessibility of mental healthcare.

Our finding that MHNs probably do not reduce GP workload, but provide additional support, is in line with a previous study on collaborative care, involving a depression care manager in primary care and consultation of mental health specialists [27]. Within that study, no differences were found in resource use, including GP care, between patients in usual care and patients in collaborative care. However, a Cochrane review on counselling in primary care suggested that although counselling in primary care does not seem to reduce (total) health care costs, it may reduce some types of healthcare usage [13]. Another review on psychiatric consultation in primary care also concluded that it may reduce usage of healthcare services [28]. Moreover, a Cochrane review on the effects of mental health workers in primary care concluded that their presence might decrease consultation rates, prescriptions of psychotropic drugs and referrals to specialists. However, effects were modest and results were not consistent among all included studies [29]. An alternative explanation for the similar workload of GPs with and without an MHN found in this study might be that one day support a week is not enough to significantly change care. Indeed, the ministry of health has proposed to increase the number of MHN working hours per practice to 40 per week. Future studies will show what the effect of these extra hours is on the recognition and referral of patients with psychological or social problems.

This study showed that MHNs treat certain GP patients more often: females, adults and patients with common psychological symptoms such as depressive or anxious feelings. This finding might be related to the fact that most MHNs are educated in general adult care, and not for the treatment of specific subgroups, such as children. Besides, some patient groups, such as the elderly, might not want to be treated by an MHN themselves. Lastly, the MHN's general knowledge may not be sufficient for complete diagnosis or

treatment of all patients, even when they do not have a DSM-IV disorder and thus officially should be treated within general practice. This seems especially plausible for specific subgroups whose treatment requires expertise, such as children. Large group practices with multiple GPs might be able to collaborate with several MHNs with varying expertise, for example, in youth or elderly mental healthcare.

It is not clear to what extent MHNs recognise and treat patients with comorbid problems. Presumably, the presence of an MHN in a general practice increases the chance that comorbid psychological problems are detected. Patients with primarily somatic problems may sometimes receive counselling or support from the MHN to learn how to manage a somatic disease or comorbid depressive or anxious feelings. Previous research in the UK suggests that the primary care setting is appropriate for the support of people with chronic psychological diseases [30,31] or comorbid somatic diseases [32].

Although in some other countries nurses similar to Dutch MHNs are working in general practices, it is not clear to what extent our results are generalisable. Factors influencing a possible shift of care from GPs to MHNs may vary strongly between countries, such as task roles, workload, (financial) regulations and patient expectations. This study also cannot conclude as to the effectiveness of treatment by MHNs. Previous research showed that although psychosocial treatment in primary care may be effective [14-16], it might be less effective than treatment in a specialist setting, possibly because of the shorter treatment duration [33]. It is highly likely that some of the patients visiting the MHN still need treatment in specialised care, especially when diagnostics are the main reason for MHN consultation. It is plausible that the presence of MHNs in general practice influences the number of patients treated in other settings of mental healthcare, such as specialised care. The increase in patients in general practice will possibly be accompanied by a decrease in patients in specialised care, as the early treatment of patients might prevent them from needing further treatment. On the other hand, it is also possible that as more patients are detected and referred by GPs and MHNs, more will be treated by specialists. To study the effects of the MHN on the patient numbers in other settings of mental healthcare, future research is needed which combines data from NIVEL-PCD with national data from specialised care.

Conclusions

MHNs and GPs in the Netherlands treat increasing numbers of patients for psychological and social problems. MHNs do not seem to replace GP care, but probably deliver additional consultations to patients. GPs with an MHN see slightly more patients with psychological or social problems than GPs without an MHN. Future research should study to what extent early treatment of patients within the general practice prevents them from needing specialised care.

Acknowledgements

The authors would like to thank Peter Spreeuwenberg for his contribution to the statistical analyses.

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Supplementary Table S1 Characteristics of general practices participating in NIVEL Primary Care Database in 2010

	Practices in 2010			
	All (n=161)	**Without MHN (n=128)**	**With MHN (n=33)**	
Patient characteristics				
Registered patients (n)	624,477	478,579	145,898	
Sex (%)				
Male	49	49	49	χ^2=0.15
Female	51	51	51	p=0.694
Age (%)				
0-19 years	24	24	23	χ^2=1.2e+03
19-44 years	35	34	38	p=0.000
45-64 years	27	28	26	
>65 years	14	15	13	
Practice characteristics				
Practice type (%)				
Solo	30	33	18	χ^2=3.08
Duo	18	17	21	p=0.215
Group	44	41	55	
Missing	8	9	6	
Degree of urbanization (%)				
Very high	17	19	12	χ^2=6.82
High	24	20	36	p=0.145
Medium	19	20	15	
Low	23	22	27	
Very low	16	19	6	
Missing	1	1	3	
Practice size (%)				
Small	23	23	24	χ^2=0.39
Medium	44	45	39	p=0.824
Large	33	32	36	
First recorded MHN consult in January (%)	-	-	58	
First recorded MHN consult before July (%)	-	-	76	

Notes: MHN=mental health nurse. Differences between practices with an MHN and practices without an MHN were analyzed using χ^2 –tests.

Supplementary Table S2 Characteristics of general practices participating in NIVEL Primary Care Database in 2011

	Practices in 2011			
	All (n=274)	**Without MHN (n=169)**	**With MHN (n=105)**	
Patient characteristics				
Registered patients (n)	1,099,939	609,193	490,746	
Sex (%)				
Male	49	49	49	χ^2=2.01
Female	51	51	51	p=0.157
Age (%)				
0-19 years	23	23	24	χ^2=1.9e+03
19-44 years	35	33	37	p=0.000
45-64 years	27	28	26	
>65 years	15	15	14	
Practice characteristics				
Practice type (%)				
Solo	25	31	15	χ^2=8.22
Duo	20	18	22	p=0.016
Group	48	44	54	
Missing	8	7	9	
Degree of urbanization (%)				
Very high	24	24	25	χ^2=10.9
High	26	26	25	p=0.028
Medium	19	21	16	
Low	18	13	27	
Very low	13	16	8	
Missing	0	1	0	
Practice size (%)				
Small	23	24	21	χ^2=4.01
Medium	43	46	37	p=0.135
Large	35	30	42	
First recorded MHN consult in January (%)	-	-	81	
First recorded MHN consult before July (%)	-	-	94	

Notes: MHN=mental health nurse. Differences between practices with an MHN and practices without an MHN were analyzed using χ^2 –tests.

Supplementary Table S3 Characteristics of general practices participating in NIVEL Primary Care Database in 2012

	Practices in 2012			
	All (n=180)	**Without MHN (n=98)**	**With MHN (n=82)**	
Patient characteristics				
Registered patients (n)	685,337	327,431	357,906	
Sex (%)				
Male	49	50	49	χ^2=7.16
Female	51	50	51	p=0.007
Age (%)				
0-19 years	22	22	22	χ^2=408
19-44 years	34	33	35	p=0.000
45-64 years	28	28	27	
>65 years	16	15	16	
Practice characteristics				
Practice type (%)				
Solo	32	42	21	χ^2=12.7
Duo	21	23	17	p=0.002
Group	43	33	56	
Missing	4	2	6	
Degree of urbanization (%)				
Very high	17	16	18	χ^2=16.1
High	26	21	32	p=0.003
Medium	20	22	17	
Low	19	13	27	
Very low	16	24	6	
Missing	1	2	0	
Practice size (%)				
Small	24	28	20	χ^2=3.12
Medium	43	45	41	p=0.210
Large	33	28	39	
First recorded MHN consult in January (%)	-	-	78	
First recorded MHN consult before July (%)	-	-	94	

Notes: MHN=mental health nurse. Differences between practices with an MHN and practices without an MHN were analyzed using χ^2 –tests.

Supplementary Table S4 Characteristics of general practices participating in NIVEL Primary Care Database in 2013

	Practices in 2013			
	All (n=247)	**Without MHN (n=109)**	**With MHN (n=138)**	
Patient characteristics				
Registered patients (n)	1,012,993	370,597	642,396	
Sex (%)				
Male	49	50	49	χ^2=30.0
Female	51	50	51	p=0.000
Age (%)				
0-19 years	22	21	22	χ^2=2.1e+03
19-44 years	34	32	35	p=0.000
45-64 years	28	29	27	
>65 years	17	18	16	
Practice characteristics				
Practice type (%)				
Solo	29	38	22	χ^2=9.52
Duo	21	23	19	p=0.009
Group	46	37	54	
Missing	4	3	6	
Degree of urbanization (%)				
Very high	23	19	26	χ^2=10.5
High	21	20	21	p=0.033
Medium	22	24	20	
Low	19	15	23	
Very low	14	21	9	
Missing	1	1	1	
Practice size (%)				
Small	21	25	19	χ^2=3.70
Medium	44	47	41	p=0.158
Large	35	28	40	
First recorded MHN consult in January (%)	-	-	88	
First recorded MHN consult before July (%)	-	-	93	

Notes: MHN=mental health nurse. Differences between practices with an MHN and practices without an MHN were analyzed using χ^2 –tests.

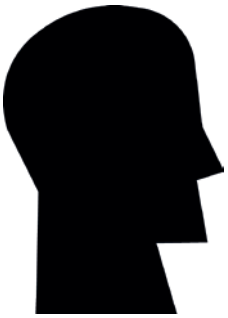
Supplementary Table S5 Characteristics of general practices participating in NIVEL Primary Care Database in 2014

	Practices in 2014			
	All (n=338)	**Without MHN (n=58)**	**With MHN (n=280)**	
Patient characteristics				
Registered patients (n)	1,392,187	211,455	1,180,732	
Sex (%)				
Male	49	50	49	χ^2=20.0
Female	51	50	51	p=0.000
Age (%)				
0-19 years	21	20	21	χ^2=329
19-44 years	33	32	33	p=0.000
45-64 years	29	30	28	
>65 years	18	19	18	
Practice characteristics				
Practice type (%)				
Solo	23	31	21	χ^2=10.3
Duo	17	24	16	p=0.006
Group	50	29	55	
Missing	9	16	8	
Degree of urbanization (%)				
Very high	22	17	23	χ^2=6.56
High	19	12	21	p=0.161
Medium	21	24	20	
Low	21	19	21	
Very low	17	26	15	
Missing	0	2	0	
Practice size (%)				
Small	21	24	20	χ^2=1.21
Medium	38	41	38	p=0.547
Large	41	34	42	
First recorded MHN consult in January (%)	-	-	83	
First recorded MHN consult before July (%)	-	-	95	

Notes: MHN=mental health nurse. Differences between practices with an MHN and practices without an MHN were analyzed using χ^2 –tests.

4

Antidepressant prescriptions and mental health nurses: an observational study from 2011 to 2015



Magnée T, de Beurs DP, Schellevis F, Verhaak PF. Antidepressant prescriptions and mental health nurses: an observational study from 2011 to 2015 (submitted).

Abstract

Background
Antidepressant prescriptions are very common in general practice, but are often not in line with recommendations. The recent introduction of mental health nurses may have decreased antidepressant prescriptions, as GPs have greater potential to offer psychological treatment as a first choice option instead of medication.

Objective
To investigate developments in antidepressant prescriptions by Dutch general practitioners, alongside the introduction of mental health nurses.

Method
Anonymised data from the medical records of general practices participating in the NIVEL Primary Care Database in 2011-2015 was analysed in an observational study. We used multilevel logistic regression analyses to determine whether total antidepressant prescriptions and antidepressants prescribed within one week of diagnosing anxiety or depression decreased in the period 2011-2015. We analysed whether changes in antidepressant prescriptions were associated with the employment or consultation of mental health nurses.

Results
Antidepressants were prescribed in 30.3% of all anxiety or depression episodes; about half were prescribed within the first week. Antidepressants prescriptions for anxiety or depression increased slightly in the period 2011-2015. The employment of mental health nurses was not associated with a decreased number of prescriptions of antidepressants. Patients who had at least one mental health nurse consultation had fewer immediate prescriptions of antidepressants, but not fewer antidepressants in general.

Conclusions
Antidepressant prescriptions are still common in general practice. So far, the introduction of mental health nurses has not decreased antidepressant prescriptions, but it may have a postponing effect.

Introduction

Antidepressant prescriptions have increased substantially over the past decades in many Western countries [1-3]. Various explanations have been proposed for this increase. General practitioners (GPs) often start the treatment of patients who have anxiety or depression with medication, [4] however, this is not the recommended first step according to guidelines [5-8]. Antidepressants should only be offered if other first choice options, such as psychoeducation or counselling, have turned out to be ineffective, or if patients show very severe dysfunction or suffering [5,6]. Antidepressant medication is only effective for patients with severe depression, and effects are minimal or non-existent in patients with moderate symptoms [9]. Pharmacological treatment should therefore be limited to patients with a disorder, as defined by DSM-5 criteria.

Once patients have started to use antidepressants, it often becomes long term [3,10-13], although guidelines recommend gradual discontinuation after remission of symptoms. Unnecessary long-term antidepressant use may have unwanted side effects for patients [14], and may result in substantial health care costs.

A major reform of Dutch mental health care was introduced in 2014, aimed at strengthening mental health care in general practice. Since 2008, GPs have been enabled to employ a professional with mental health expertise: a mental health nurse. In 2014, the majority of GPs collaborated with a mental health nurse [15]. Mental health nurses provide short-term psychological treatment and perform diagnostic assessments, but also improve expertise within general practices. They do not prescribe medication themselves. They mainly treat female, adult patients with common mental health problems [15]. The GP decides which patients are transferred to the mental health nurse.

A Cochrane review concluded that the integration of mental health professionals in primary care decreased psychotropic prescribing [16]. Such changes in the behaviour of primary care providers are seen as beneficial 'side effects'. In line with this review, the introduction of mental health nurses may have decreased antidepressant prescriptions by GPs. By employing mental health nurses, Dutch GPs increased their mental health expertise, but also have more opportunities to offer psychological treatment as a first choice option instead of medication. As a result, Dutch GPs should

be better able to adhere to the guidelines. We hypothesised that the introduction of mental health nurses was associated with a decrease in antidepressant prescriptions, especially immediately after diagnosis.

The aim of this study was to investigate developments in antidepressant prescriptions in Dutch general practices alongside the introduction of mental health nurses. Using a national primary care database, we examined: (1) whether the (immediate) antidepressant prescriptions of Dutch GPs had decreased in recent years, (2) how often GPs prescribed antidepressants for patients with mild symptoms, and (3) whether the employment or consultation of mental health nurses in general practices was associated with a decrease in (immediate) antidepressant prescriptions.

Methods

Database

Anonymised data from the 2011 to 2015 electronic medical records of general practices participating in the NIVEL Primary Care Database (NIVEL-PCD)[17] were analysed in an observational study. All non-institutionalised inhabitants of the Netherlands are registered at a general practice. The general practices and their patient populations are representative for Dutch general practices and the Dutch population, although group practices are somewhat overrepresented. Only practices that participated during the five years (2011-2015) and which had the most complete data for the recording of diagnoses (at least 70%; 96% on average) were included in this study (n=74). For practice and patient characteristics, see Supplementary Table S1.

Data

Only patients aged between 10 and 65 years in 2011, who were registered at the practice during the full study period, were selected for this study (n=197,512). Patients older than 65 years were excluded, because they often use a combination of various medicines, which complicates the (new) prescription of antidepressants.

Caregivers participating in the NIVEL-PCD routinely record data, such as consultations, diagnoses, and prescriptions. Based on the recorded

data, episodes of illness were defined with a start and stop date. Patients could have multiple episodes concerning one diagnosis, if they had a disease free period (without any consultations or prescriptions) of at least three months (the usual time for follow up prescriptions) in between. GPs classify diagnoses according to the International Classification of Primary Care (ICPC), based on their clinical evaluation. We included all patients (n=27,044) with at least one episode involving anxious feelings (ICPC code P01), depressive feelings (P03), anxiety disorder (P74), or depressive disorder (P76).

Outcome measures

We included all prescriptions of antidepressant drugs, recorded with the Anatomical Therapeutic Chemical Classification System (ATC) codes: N06AA, N06AB, N06AF, N06AG, and N06AX. We determined whether at least one prescription of antidepressants was recorded during each episode. We also determined whether at least one prescription of antidepressants was recorded during the first week of the episode. Data was analysed at episode level, because anxiety and depression are recurrent diseases, and we wanted to analyse the potential influence of mental health nurses during new episodes.

Independent variables

We used the age category (10-19 years, 19-45 years, or 45-65 years in 2011) and the sex of the patients as independent variables. To investigate time effects, the starting year of episodes was used as an independent variable. We determined what type of diagnosis was recorded for each episode: psychological symptoms (depressive or anxious feelings), or a psychiatric disorder (depression or anxiety). We investigated whether the episode started after or before the employment of a mental health nurse (the first recorded mental health nurse consultation in the five included years was used as the employment date). To examine the influence of mental health nurse involvement, we considered whether the patient had at least one mental health nurse consultation during the first three months of the episode (yes or no).

Confounders

We identified whether the patient had received any medication in addition to antidepressants in the three months preceding the episode or in the first month of the episode (yes or no). Other medication use was likely to affect (new) prescriptions of antidepressants.

Episode duration was determined by calculating the difference in days between the start date and the stop date. Because data was available for 2011-2015, episodes that started in 2011 had the highest maximum episode duration, and therefore, analyses were adjusted for episode duration (centred for the average).

Statistical analyses

We performed two multilevel repeated measures logistic regression analyses, using three hierarchic levels: episodes clustered within patients, and patients clustered within general practices. Repeated measures analyses were used to control for the correlation between episodes within a patient. The outcome variable of the first analysis was receiving at least one prescription of antidepressants. The outcome variable of the second analysis was receiving an immediate prescription of antidepressants. Only patients with at least one prescription of antidepressants were included in the second analysis. We calculated the main effects of six independent variables: year, age, sex, type of diagnosis, mental health nurse employment, and mental health nurse consultation. To determine whether the effects of mental health nurses varied over time, interaction effects between year and mental health nurse employment and year and mental health nurse consultation were calculated. Only episodes that started between 1 April 2011 and 1 October 2015 were included in the analyses to have complete data on mental health nurse consultation and medication. This excluded n=4,389 episodes (n=1,935 patients). All episodes were included in the figures provided to maintain comparability between years. The significance level was set at <0.01. All analyses were performed using MLwiN 2.30.

Results

Descriptive statistics

In the period 2011-2015, 27,044 patients from the total of 197,512 registered patients had at least one episode of anxiety or depression (13.7%). Most patients (64.1%) only had one episode of anxiety or depression during 2011-2015. Fewer patients had two (23.2%) or three (7.7%) episodes. Only 5.0% had four or more episodes of anxiety or depression. In total, n=42,423 episodes of anxiety of depression were recorded.

Most episodes concerned anxious feelings (34.7%) or a depressive disorder (26.0%). Fewer episodes concerned depressive feelings (20.5%), or an anxiety disorder (18.9%). Most patients (86.5%) had a single diagnosis.
In 2011, 41% of general practices employed a mental health nurse. This increased to 88% in 2015 (Supplementary Table S1).

Antidepressant prescriptions in 2011-2015

In 2011-2015, patients were prescribed an antidepressant in 30.3% of 42,423 episodes. Patients were prescribed antidepressants within the first week after diagnosis in 15.4% of the episodes.

Figure 1 shows the number of episodes for anxiety or depression and how often an antidepressant was prescribed in 2011-2015. After adjustment for episode duration, the rate of antidepressant prescriptions for anxiety or depression showed a slight increase in the period 2011-2015 (Table 1A). Time trend analysis showed a significant linear effect. No significant (linear or other) overall time effect was found for immediate antidepressant prescriptions, however, the number of immediate antidepressant prescriptions was lower in 2015 compared to 2011 (OR=0.67; 95%CI=0.58-0.78).

Table 1 Time trends of (immediate) antidepressant prescriptions by Dutch general practitioners for patients during episodes of anxiety or depression (2011-2015) and associations with the presence of a mental health nurse, type of diagnosis, and patient's sex and age

	(A) Receiving at least one antidepressant prescription during an episode			**(B) Receiving an immediate antidepressant prescription during an episode**		
Number of patients in analyses	**n=25,109 GP patients with at least one episode of anxiety or depression**			**n=8,217 patients with at least one episode of anxiety or depression and at least one prescription of antidepressants**		
Number of observations (episodes)	**n=38,034**			**n=11,180**		
	OR	**p**	**95% CI**	**OR**	**p**	**95% CI**
Episode characteristics						
Year						
2011 (reference)						
2012	0.94	0.13	0.87 – 1.02	0.95	0.42	0.84 – 1.08
2013	1.12	0.006	1.03 – 1.21	1.16	0.02	1.02 – 1.32
2014	1.04	0.35	0.96 – 1.13	0.99	0.86	0.86 – 1.13
2015	1.17	<0.001	1.07 – 1.28	0.67	<0.001	0.58 – 0.78
Employment of the MHN						
Episode started while no MHN was working in the practice (reference)						
Episode started while an MHN was working in the practice	1.01	0.74	0.93 – 1.10	1.02	0.71	0.90 – 1.16

-continued-

- Table 1 continued -

	(A) Receiving at least one antidepressant prescription during an episode			(B) Receiving an immediate antidepressant prescription during an episode		
Number of patients in analyses	**n=25,109 GP patients with at least one episode of anxiety or depression**			**n=8,217 patients with at least one episode of anxiety or depression and at least one prescription of antidepressants**		
Number of observations (episodes)	**n=38,034**			**n=11,180**		
	OR	**p**	**95% CI**	**OR**	**p**	**95% CI**
At least one MHN consultation during the episode						
No (reference)						
Yes	1.00	0.90	0.94 – 1.07	0.45	<0.001	0.41 – 0.50
Type of diagnosis						
Depressive or anxious feelings (reference)						
Depressive or anxiety disorder	2.09	<0.001	1.98 – 2.21	0.76	<0.001	0.70 – 0.83
Patient characteristics						
Sex						
Male (reference)						
Female	1.04	0.22	0.98 – 1.10	0.99	0.76	0.91 – 1.07

-continued-

- Table 1 continued -

	(A) Receiving at least one antidepressant prescription during an episode			(B) Receiving an immediate antidepressant prescription during an episode		
Number of patients in analyses	**n=25,109 GP patients with at least one episode of anxiety or depression**			**n=8,217 patients with at least one episode of anxiety or depression and at least one prescription of antidepressants**		
Number of observations (episodes)	**n=38,034**			**n=11,180**		
	OR	**p**	**95% CI**	**OR**	**p**	**95% CI**
Age category						
10-19 years (reference)						
19-45 years	4.17	<0.001	3.59 – 4.84	2.16	<0.001	1.63 – 2.85
45-65 years	6.67	<0.001	5.74 – 7.75	2.71	<0.001	2.05 – 3.58

Notes: GP=general practitioner. OR=odds ratio. 95%CI=95% confidence interval. An OR higher than 1.0 reflects an increased chance of receiving at least one (immediate) prescription of antidepressants during an episode, compared to the reference group. Analyses were adjusted for other medication use (yes/no), and episode duration centred for the average. Episodes had a duration of 199.9 days (SD=255.3, max=1823), or 28.6 weeks, on average. Mean episode duration decreased from 286.7 days for episodes started in 2011 (SD=417.7) to 122.4 days for episodes started in 2015 (SD=86.9).

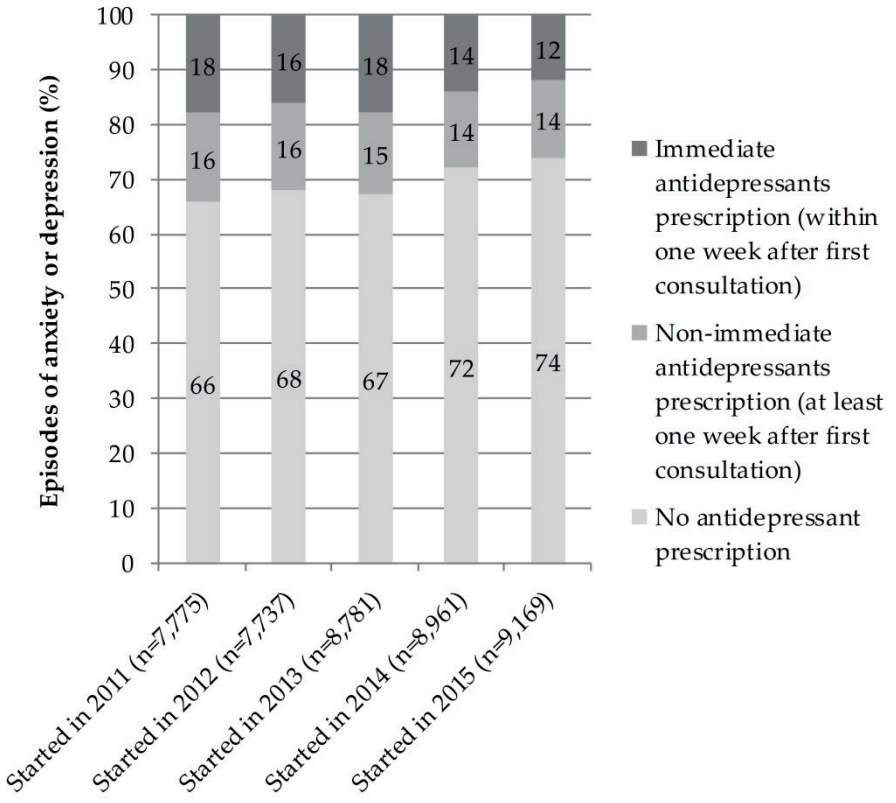


Figure 1 GP antidepressant prescriptions for anxiety or depression in 2011-2015 (not adjusted for episode duration)

Antidepressant prescriptions for disorders versus symptoms

Figure 2 shows antidepressant prescriptions according to diagnosis in 2011-2015. Patients with an episode of a disorder more often received at least one prescription of antidepressants, compared to patients with depressive or anxious feelings (OR=2.09; 95%CI=1.98-2.21), however, the chance to receive an immediate prescription of antidepressants was relatively low during episodes of a disorder (OR=0.76; 95%CI=0.70-0.83).

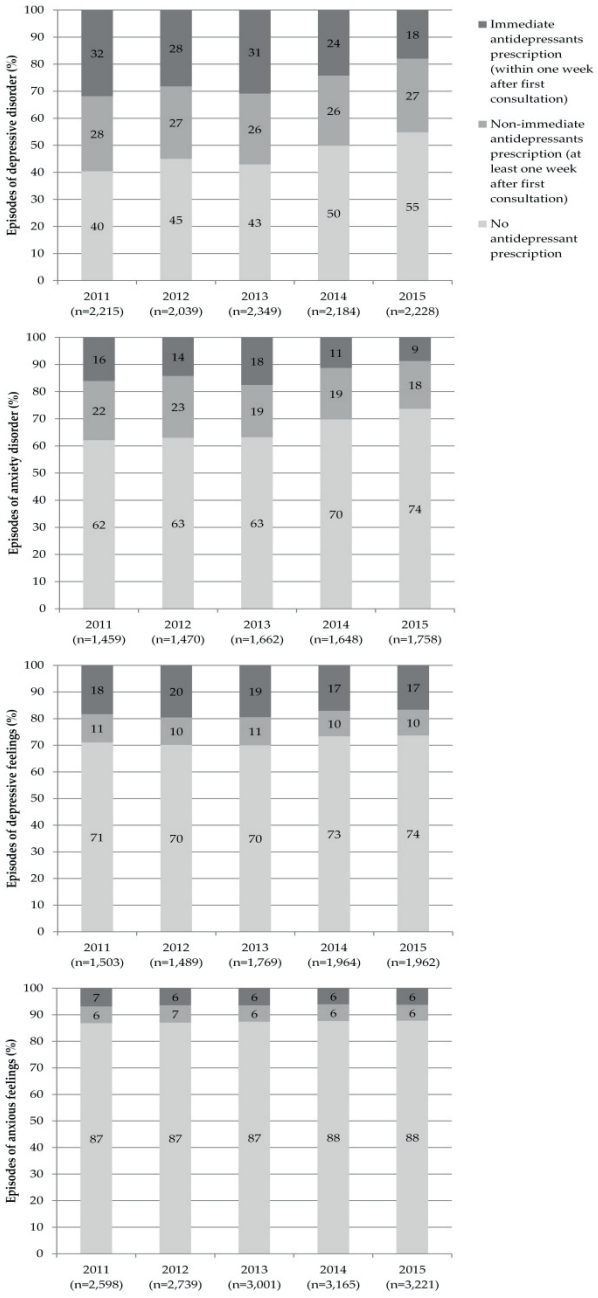


Figure 2 GP antidepressant prescriptions according to diagnosis in 2011-2015 (not adjusted for episode duration)

The association between antidepressant prescriptions and mental health nurses

Figure 3A shows how often antidepressants were prescribed in episodes that started before or after the employment of a mental health nurse. Antidepressants were not prescribed less often in episodes that started after a mental health nurse was employed (OR=1.01; 95%CI=0.93–1.10; Table 1A). How often antidepressants were prescribed immediately also did not differ between episodes that started before or after the employment of a mental health nurse (OR=1.02; 95%CI=0.90–1.16; Table 1B). No significant interaction effects were found between mental health nurse employment and year.

Figure 3B shows how often antidepressants were prescribed in episodes with and without at least one mental health nurse consultation. Patients with at least one mental health nurse consultation received antidepressants as often as patients without mental health nurse consultations (OR=1.00; 95%CI=0.90-1.16), but they received fewer immediate antidepressant prescriptions (OR=0.45; 95%CI=0.41-0.50). No significant interaction effects were found between mental health nurse employment and year.

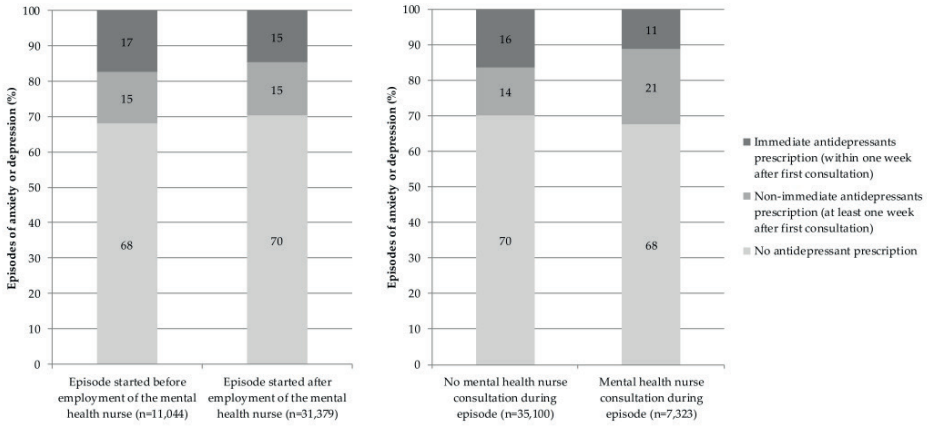


Figure 3 GP antidepressant prescriptions for anxiety or depression: the effect of mental health nurses (not adjusted for episode duration)

Discussion

Summary

GPs prescribed antidepressants for 30.3% of anxiety or depression episodes, and about half of them were prescribed in the first week after diagnosis. Antidepressant prescriptions slightly increased in 2011-2015. Immediate antidepressant prescriptions were lower in 2015, compared to 2011. Antidepressants were more often prescribed for disorders than symptoms. The employment of mental health nurses was not associated with a decrease in total or immediate antidepressant prescriptions. In episodes with at least one mental health nurse consultation, fewer immediate prescriptions of antidepressants were provided, but there were as many total antidepressant prescriptions, compared to episodes without mental health nurse consultation.

Strengths and limitations

A major strength of this study is that we were able to analyse antidepressant prescriptions amongst a large number of GP patients for five sequential years. Since this was an observational study, we cannot conclude on causal effects, however, routinely recorded GP data enabled us to compare antidepressant prescription rates before and after the employment of mental health nurses, as in a natural experiment.

The lack of an association between mental health nurse employment and antidepressant prescriptions may be partly explained by the fact that we had to use a cut-off point to indicate the start of the mental health nurse. In reality, the integration of mental health nurses in practices probably evolves gradually over time.

Another limitation to the study is that our results are an underestimation of antidepressant prescriptions, for two reasons. Firstly, patients who had been using antidepressants since 2010 or before and did not have a new episode of anxiety or depression during the study period were not included. Secondly, we could not include prescriptions of antidepressants provided through pharmacies. Patients sometimes receive antidepressants directly from pharmacies, but only after a first prescription is provided by the GP.

Antidepressants are sometimes prescribed for somatic diseases, such as (chronic) pain. It is plausible that some of the antidepressants prescribed

during episodes of anxiety or depression were actually mainly prescribed for the treatment of such other diseases. We decided it was useful to include all antidepressant prescriptions, to provide a complete overview, and because it can be reasoned that the prescribed antidepressants were also (intended or not) part of the treatment of depression or anxiety.

Comparison with existing literature

The overall GP antidepressant prescription rates in this study are somewhat lower than the rates reported in other studies on depression [3,18]. This may be due to the inclusion of episodes for mild symptoms, but also to the presentation of our results at episode and not at patient level.

We found a modest increase over time in antidepressant prescriptions. Since 2014, GPs have had to treat more patients with mental health problems, as a new policy aimed at substitution stimulated the shift of patients from specialised to primary care [15]. As a result, GP workload may have expanded, despite the introduction of mental health nurses. High workload could make antidepressant prescription a more attractive (quick) alternative to psychological treatment, since time limitations form a barrier to adhering to guidelines [19].

The antidepressant prescription behaviour of GPs was not always in line with guidelines. GPs frequently prescribed antidepressants for patients with mild symptoms, and antidepressant prescriptions within the first week of an episode were common. Previous studies have already demonstrated that depression and anxiety care provided in clinical practice is sometimes not concordant with guidelines [13,19]. There may be various reasons for GPs to deviate from recommendations, such as patient preferences or the personal history of the patient.

Mental health nurses in general did not seem to decrease antidepressant prescriptions. A Cochrane review concluded that the presence of mental health professionals in primary care decreased the prescriptions of psychotropic drugs [16], however, this decrease was only found amongst patients who were actually treated by the mental health professional, and not applicable to the wider practice population. From this point of view, the results of our study are in line with the review, as actual mental health nurse consultation (and not mental health nurse employment) was associated with a decrease in immediately prescribed antidepressants. Mental health nurse consultation was not associated with a decrease in the

total number of antidepressants, however. So far, Dutch mental health nurses only seem to have had a postponing effect on GPs' antidepressant prescriptions.

Implications for research

The potential effect of mental health nurses on antidepressant prescriptions might have been limited in the first place. As both depression and anxiety are recurrent diseases, some of the patients in our study, especially older patients, might have had one or more previous episodes. They may already have become long term antidepressant users, as many antidepressant users do [3,10-13]. The full effect of mental health nurses on GP prescription behaviour should therefore be evaluated over a longer period of time. Future research should also qualitatively investigate the role of mental health nurses in the antidepressant prescription behaviour of GPs, the role of waiting lists for mental health nurse treatment, and it should involve the potential decreasing effects of mental health nurses on referrals to mental health care.

Conclusions

Antidepressant prescriptions are still common in general practice. So far, the introduction of mental health nurses has not resulted in a decrease in antidepressant prescriptions as a beneficial side effect, but it may have had a postponing effect.

Acknowledgements

We would like to thank Peter Spreeuwenberg for his contributions to the statistical analyses.

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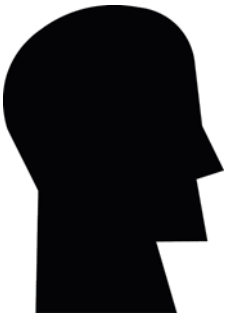
Supplementary Table S1 General practices and patient population

Practice characteristics	**n=74**
Practice type % (n)	
Solo	25.7 (19)
Duo	18.9 (14)
Group	52.7 (39)
Missing	2.7 (2)
Degree of urbanisation % (n)	
Very high	18.9 (14)
High	23.0 (17)
Medium	18.9 (14)
Low	21.6 (16)
Very low	17.6 (13)
Missing	0
Mental health nurse in practice % (n)	
In 2011	40.5 (30)
In 2012	55.4 (41)
In 2013	66.2 (49)
In 2014	87.8 (65)
In 2015	87.8 (65)
No mental health nurse	12.2 (9)
Patient characteristics	**n=260,900**
Sex % (n)	
Male	49.91 (130,216)
Female	50.09 (130,684)
Age % (n)	
0-19 years	23.20 (60,529)
19-44 years	31.85 (83,089)
45-64 years	30.51 (79,613)
>65 years	14.44 (37,669)

Notes: In 2015, two new general practices employed a mental health nurse, but two other practices no longer employed a mental health nurse.

5

Exploring the feasibility of new Dutch mental health policy within a large primary health care center: a case study



Magnée T, de Beurs DP, Kok T, Verhaak PF. Exploring the feasibility of new Dutch mental health policy within a large primary health care center: a case study (accepted for publication in Family Practice).

Abstract

Background
A reform of Dutch mental health care aimed to substitute care from specialized care to general practice. Since 1 January 2014, Dutch general practitioners (GPs) are no longer allowed to refer patients without a psychiatric disorder to mental health care. Patients with non-complex psychological problems should be treated within general practice.

Objective
To explore the feasibility of the Dutch mental health policy.

Methods
We conducted an observational case study in a primary health care center in 2014. The health care center was a convenience sample; the participating GPs reorganized mental health care in line with the upcoming policy, and invited the researchers to monitor their referrals. We assessed how many patients with mental health problems (n=408) were allocated to policy-concordant treatment. Additionally, 137 patients (33%) completed a follow up assessment on mental health problems three months after baseline.

Results
The majority of the patients were allocated to treatment in line with the policy. Almost half of the patients (42%) were treated in a setting that was exactly policy-concordant, while the other half (47%) was treated in a setting that was even less specialized than was allowed. In general, patients showed improvement after three months, regardless of (not) policy-concordant treatment. The attrition rate after three months was high, probably due to the practical study design.

Conclusions
There is potential for substitution of mental health care. Since the studied health care center was specialized in mental health care, further research should explore if similar results can be found in other general practices.

Introduction

Mental health problems are highly prevalent worldwide [1]. In the Netherlands, mental health care costs have increased rapidly [2]. An important reason for this sharp increase was that many people with mild complaints were treated within expensive specialized mental health care. Previous studies suggest that, worldwide, up to one third or even one half of the patients in specialized mental health care do not meet the formal criteria for a psychiatric disorder [3-6]. Some of these patients could have been treated in primary care instead.

In 2014, a major mental health reform was introduced in the Netherlands. One of the main aims of this reform was substitution: shifting patients from specialized care to primary care, especially general practice. In the Dutch mental health care system, GPs function as gatekeepers. Since the reform, GPs are no longer allowed to refer patients without a psychiatric disorder to mental health care. Patients with mild psychological problems should be treated within general practice instead. Mental health care within general practice consists of psychopharmacological treatment and/or short term (online) psychological treatment, such as counselling or brief therapy [7,8]. To cope with the increasing demand for mental health care in general practice, the majority of Dutch general practitioners collaborate with a professional with mental health expertise [9].

Since the reform, only patients who meet the formal criteria for a psychiatric disorder can be referred to basic mental health care for short term treatment by a psychologist, with a maximum of twelve consultations. Patients with complex mental health problems, high risk of (self) harm, or recurrent problems can be referred to specialized mental health care for long-term treatment by a multidisciplinary team.

The aim of this study was to explore the feasibility of the new Dutch mental health policy and referral rules in a large primary health care center. We examined: (1) how many patients with mental health problems were allocated to policy-concordant treatment, and (2) if policy-concordant treatment was related to bigger improvement of symptoms after three months.

Methods

Design

In an observational case study, we investigated the GPs' decisions on treatment allocation of patients with mental health problems after a recent policy change.

Setting

The study was carried out in a large primary care center in the northern part of the Netherlands that was well equipped to provide mental health care. The primary health care center can be considered a convenience sample; the participating GPs organized mental health care in line with the upcoming policy, and invited the researchers to monitor the referral patterns. In the center, eight GPs (6.7 fte) and two mental health nurses (1.4 fte) provide mental health care. Additionally, two primary care psychologists provide basic mental health care in the same center. The GPs have their own mental health policy, including a regular mental health meeting and formal care plans about the treatment of patients with mental health problems (including the use of a screening instrument to assess mental health problems). Many Dutch GPs work in large health care centers together with primary care psychologists [10], collaborate with mental health nurses [9], and use a screening instrument to assess mental health problems. Dutch GPs follow national guidelines for the management of mental health problems that are based on the principle of stepped care [11,12]. This means that GPs usually start treatment with the least invasive treatment that is still expected to generate effects. The GPs working in the studied health care center, however, were particularly interested in the field of mental health care and made additional formal agreements on the treatment of their patients with mental health problems. Also, the GPs were motivated to have the effects of their workflow monitored. This made the studied health care center a good starting point to explore the feasibility of the new Dutch policy rules.

Participants

All patients with mental health problems visiting one of the GPs working in the primary health care center between 1 January and 31 December 2014 were included in the study (n=408). All of the patients provided informed consent for anonymous use of their data.

Procedure

At baseline, the patients completed the Four-Dimensional Symptom Questionnaire (4DSQ), which is a widely used and validated questionnaire to assess mental health problems in primary care [13,14]. The 4DSQ was already part of the assessment before this study was performed. Furthermore, GPs assessed three aspects of mental health problems (risk of (self) harm, complexity, and course of the symptoms) during a consultation, before deciding on treatment allocation for each patient.

Based on the outcomes of the 4DSQ and the GP assessment, the following four treatment allocation options were available: (1) GP treatment (including 'watchful waiting' or no further treatment), (2) treatment by the mental health nurse within general practice, (3) treatment in basic mental health care (short term care), or (4) treatment in specialized care (Table 1). Additionally, the practice assistant asked the patients to complete the 4DSQ a second time three months after baseline.

Outcomes

The following four dimensions of mental health problems were assessed with the 4DSQ: distress, anxiety, depression, and somatisation. For each dimension, a total sum score and a categorized score (low, medium, or high) were calculated, following the instructions of the 4DSQ. The 4DSQ can be used to distinguish between 'normal' distress and psychopathology [15-17]. A high score on the distress scale indicates that a person is likely to have psychological symptoms within a 'normal' range, while a high score on the somatization, anxiety, or depression scale indicates that the responder is likely to have a psychiatric disorder. Standardized sum scores were calculated to facilitate comparability between scales (dividing the sum score by the number of items, multiplied by ten).

During the GP assessment, the GPs rated three aspects of psychological problems from low to medium to high, as follows:

(1) Complexity: single disorder – more complicated but possibilities for short-term treatment – complicated because of comorbidity or personality;
(2) Risk of (self) harm: no risk – latent risk but sufficient protection – high risk; and,
(3) Course of the symptoms: relatively new symptoms – continuing symptoms – recidivist or chronic symptoms.

Table 1 Algorithm to determine treatment allocation according to the Dutch mental health policy introduced in 2014

Treatment allocation	**Patients that should be treated in the setting according to policy**	**Baseline assessment scores algorithm**
General practitioner	Patients without a psychiatric disorder, non-complex problems, low risk, and new symptoms	(Low or medium scores on each of the four 4DSQ dimensions) AND (low scores on complexity, risk, and course)
Mental health nurse	Patients without a psychiatric disorder, but with somewhat more (complex) problems	(A medium score on either complexity, risk, or course) OR (a high score on 4DSQ distress) OR (a medium score on either 4SDQ anxiety, depression, or somatisation)
Basic mental health care (short term care)	Patients with a (suspected) psychiatric disorder	A high score on either 4DSQ anxiety, depression, or somatisation
Specialized care	Patients with high risk, highly complex problems, or recurrent symptoms	A high score on either complexity, risk, or course (overrules 4SDQ scores)

Notes: Risk=risk of (self) harm. The GP assessment was not complete for all patients (see results section). For these patients policy recommended treatment was based on the 4DSQ only; no or GP treatment when all 4DSQ dimensions were low; mental health nurse treatment when at least one 4DSQ dimension was medium; basic mental health care when at least one score on anxiety, depression or somatisation was high; and specialized care when at least two scores on anxiety, depression, or somatisation were high.

A treatment allocation according to policy recommendations was calculated (Table 1) based on baseline assessment (4DSQ and GP assessment) and policy recommendations by the Dutch Healthcare Authority [18]. If the actual treatment allocation agreed with the treatment allocation according to policy, then it was coded as policy concordant treatment; and if not, then it was coded as not policy-concordant.

Analyses

Descriptive statistics were provided to compare whether patients were referred to either policy accordant or not policy accordant treatment. More specifically, policy concordance was based on the scores on the different subscales of the 4SDQ, and the GPs rating of the three aspects of psychological problems as described above.

Additionally, in explorative analyses, differences between baseline and follow up mental health problems were analyzed with Wilcoxon signed rank tests for each treatment allocation separately. As the practice assistant only once asked the patients to complete the 4DSQ a second time three months after baseline, and no additional effort could be made to obtain more data due to privacy and practical issues, we expected a large proportion of missing data. Patients with missing follow-up data were excluded from analyses. Patients in- and excluded were compared on age, gender, and baseline mental health problems using t-tests and χ^2 tests ($p<0.05$ is significant). Associations between change in 4DSQ scores after three months and policy-concordant treatment allocation were estimated using linear regression analysis and adjusted for baseline mental health problems, and the age and gender of the patients. Analysis effects were deemed significant if $p<0.01$ because of multiple testing. All analyses were performed using Stata 14.0. Sensitivity analyses were performed to explore the effects of a more liberal interpretation of the policy recommendations (Supplementary Table S4).

Results

Between 1 January 2014 and 31 December 2014, 408 patients with mental health problems were included (Figure 1). The baseline data were complete for 352 patients (86%). No differences were found between patients with and

patients without complete baseline data in gender, risk of (self) harm, complexity, or 4DSQ scores. After three months, 137 patients (33%) completed the follow-up assessment. Differences in age (p=0.03) and course of symptoms (p=0.02) were found between patients that did and patients that did not complete the follow-up assessment. Patients that completed the follow-up assessment were somewhat older and had relatively new symptoms in comparison to patients that had not completed the follow-up assessment (Supplementary Table S1).

Descriptive statistics

Supplementary Table S1 shows the descriptive statistics of the 408 patients included at baseline and of patients included in analyses. At baseline, patients were mostly female (66%), with a mean age of 45.0 years (SD=16.5). Most patients showed a high 4DSQ distress score, and a low depression, anxiety, or somatisation score. Regarding the GP assessment, most patients scored low on complexity (34%) and risk of (self) harm (47%). The prognosis for the course of symptoms was medium for most patients (27%).

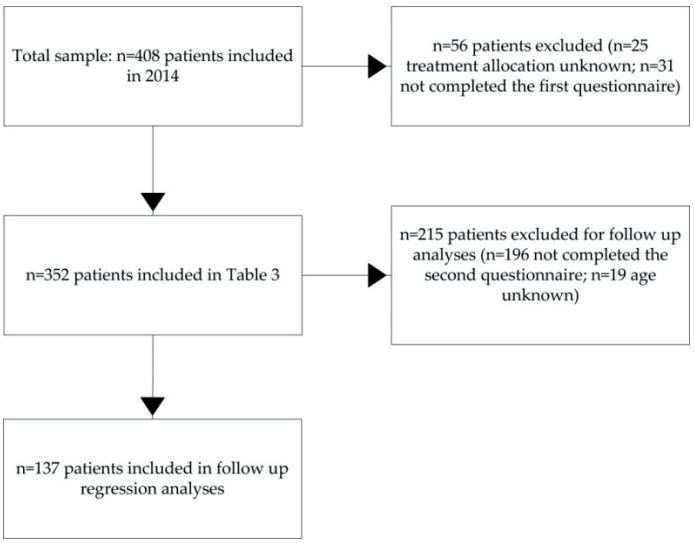


Figure 1 Flowchart of patients with mental health problems visiting GPs in a large Dutch primary health care center in 201

Treatment allocation

Table 2 shows the number of patients that were allocated to the four different treatment options. Most patients were allocated to treatment in general practice for GP treatment (n=106; 30%) or for treatment by the mental health nurse (n=156; 44%). Of the patients who were allocated to treatment outside the general practice, most (n=68; 19%) were allocated to treatment in basic mental health care. Only a small number of patients were allocated to treatment in specialized care (n=22; 6%).

Policy-concordant treatment allocation

Table 2 shows the number of patients that were allocated to policy-concordant treatment. Of all the patients, almost half (n=147; 42%) were allocated to policy-concordant treatment. A total of 159 patients (45%) were allocated to treatment in a less specialized setting than was allowed policy. A total of 46 patients (13%) were allocated to a treatment more specialized than allowed by policy.

Table 2 Actual versus policy recommended treatment allocation of GP patients with mental health problems visiting a large primary health care center in the Netherlands

	Actual treatment allocation				
Treatment allocation recommended by policy	GP	Mental health nurse	Basic MHC	Specializ. MHC	**Total**
GP	24	23	1	1	**49**
Mental health nurse	63	71	17	3	**154**
Basic MHC	11	46	35	1	**93**
Specialized MHC	8	16	15	17	**56**
Total	**106**	**156**	**68**	**22**	**352**

Policy-concordant treatment allocation (n=147; 42%)
More specialized treatment than allowed by policy (n=46; 13%)
Less specialized treatment than allowed by policy (n=159; 45%)

Notes: GP=general practitioner. MHC=mental health care.

Improvement of the symptoms after three months (explorative analyses)
Figure 2 shows that, in general, patients improved on the four 4DSQ dimensions after three months. Differences between baseline and follow-up measurement were significant (p<0.01) for all 4DSQ dimensions for the four treatment allocations, except for the distress (p=0.05) and somatisation (p=0.72) dimensions for patients allocated to treatment in specialized care, and for the depression (p=0.07), anxiety (p=0.73), and somatisation (p=0.19) dimensions for patients allocated to GP treatment. However, based on the linear regression analyses, the changes in the 4DSQ scores after three months were not associated with treatment allocation for distress, anxiety, depression, or somatisation (Supplementary Table S2).

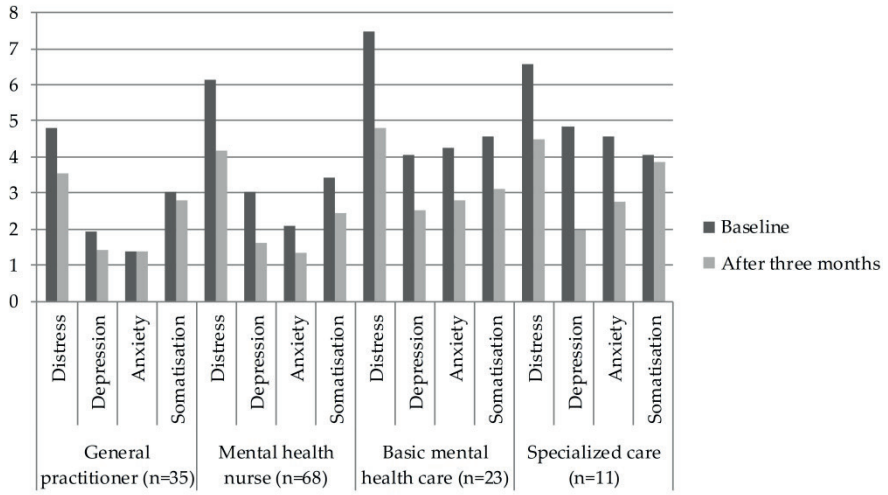


Figure 2 Changes in 4DSQ scores of Dutch GP patients with mental health problems after three months according to treatment allocation

Figure 3 shows that, on average, the patients improved on the four 4DSQ dimensions after three months, regardless of whether treatment allocation was policy-concordant or not. Differences between baseline and follow-up measurement were significant for all 4DSQ dimensions for each of the three groups, except for depression (p=0.31), anxiety (p=0.21), and somatisation (p=0.26) in the group that had more specialized treatment than recommended by policy. However, based on the linear regression analyses,

the changes in the 4DSQ scores after three months were not associated with policy-concordant treatment for distress, anxiety, depression, or somatisation (Supplementary Table S3).

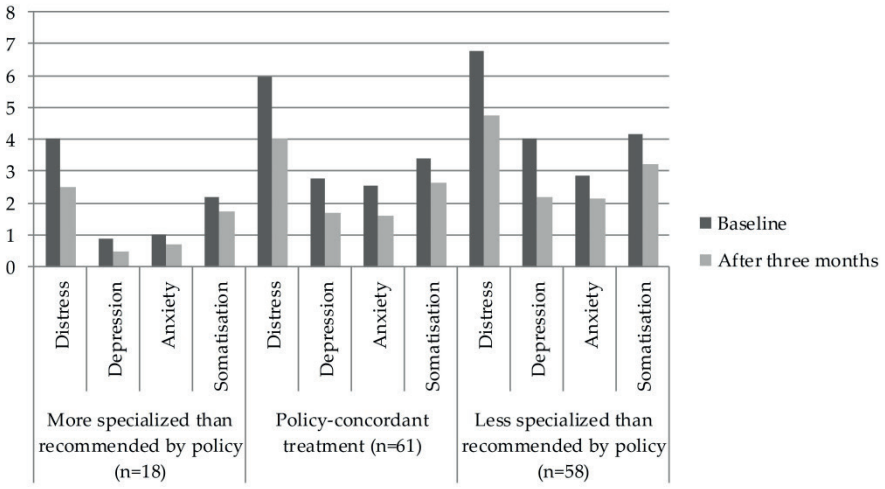


Figure 3 Changes in 4DSQ scores of Dutch GP patients with mental health problems after three months according to (not) policy-concordant treatment allocation

Sensitivity analyses

Applying a more liberal interpretation to policy recommendations increased the total number of patients that were allocated to policy-concordant treatment with 5% from 42% to 47% (Supplementary Table S5). Analyses with this outcome showed the same results as the original analyses: no significant associations were found between policy-concordant treatment and improvement of symptoms.

Discussion

Principal findings

Approximately 42% of the patients was allocated exactly according to the new policy rules. Another 45% was allocated to a setting that was even less specialized than was permitted by policy. The last 13% was allocated to a setting more specialized than allowed by policy. In general, the patients showed improvement of symptoms after three months, regardless of treatment allocation or (not) policy-concordant treatment. Attrition rate after three months was high, probably due to the practical design of the study.

Interpretation

Our study showed that the majority of patients with mental health problems visiting a well-prepared primary health care center were initially treated within general practice. This is in line with previous research [19-21]. The GPs' decisions on treatment allocation were often in line with new policy aimed at the substitution of mental health care towards general practice. The GPs had a tendency to refer even fewer patients to mental health care than the new referral rules allowed. Thus, the GPs seemed to follow the principle of stepped care, which is an important aspect of the national GP guidelines for the management of mental health problems [11,12], starting treatment with the least invasive or least specialized option. The GPs do not base their decision on treatment on just one consultation with a patient but are familiar with, for example, their history, coping abilities, somatic diseases, social support system, and treatment preferences. The patients might sometimes prefer treatment in general practice instead of a more specialized setting because of accessibility, familiarity, or financial benefits. Unwanted circumstances, such as waiting lists for specialized care, may also force GPs to deviate from policy.

In general, the patients seemed to improve after three months, regardless of (policy-concordant) treatment allocation. This is an indication that the clinical evaluations and treatment decisions of participating GPs were of good quality. The attrition rate after three months, however, was high (see 'strengths and limitations').

The primary care center in our study was specialized in mental health care. Therefore, this study demonstrates the potential of mental health care in primary care in optimal circumstances. In the Netherlands,

most GPs work in group practices or in primary health care centers that are comparable to the one selected for this study [10]. Moreover, the majority of the GPs collaborate with a mental health nurse [9], which seems to be an important condition for the successful use of the new referral rules. Thereby, integration of the new policy is probably feasible for at least a significant part of the Dutch GPs. GPs working in solo practices and GPs without a mental health nurse or with little experience in the field of mental health, however, may have more difficulties with the new referral rules. These GPs may need extra training or other adaptations in order to be able to successfully adopt the new referral rules.

Future research should further explore the GPs' mental health expertise, reasons to deviate from policy, the feasibility of the new policy and referral rules in other (less well prepared, and more solo operating) general practices. It should also investigate long-term patient outcomes in a larger sample of patients, with more extensive measures to prevent attrition.

International relevance

According to the World Health Organization, it is important to stimulate the integration of mental health care into the general health care setting [22]. Worldwide, numerous initiatives have been undertaken to promote the substitution of mental health care from specialized care towards primary care [7,8,23-29]. These initiatives include the training of GPs, enabling consultation-liaisons (the possibility for primary care physicians to consult mental health specialists), and developing collaborative care, usually by integrating mental health professionals, such as nurses, into the primary care staff.

Potential for substitution of mental health care is likely to exist in countries besides the Netherlands, with varying numbers of patients without a psychiatric disorder receiving specialized mental health care [3,4]. The findings of this study are most relevant for countries in which the GP has a gatekeeper function and a certain level of mental health expertise and where sufficient possibilities exist to provide mental health care in general practice. GPs working in the UK [30], Canada [31], and Australia [32] are collaborating with professionals similar to mental health nurses. This may enable substitution of mental health care towards general practice.

Workload in general practices in other countries is often lower than the workload in Dutch general practices [33], which might contribute to

successful substitution. According to an international comparison of high-income countries, including the UK, Australia, and the US, Dutch primary care physicians have the best abilities to diagnose depression [34], although large variations may exist between physicians within countries. Even Dutch GPs, however, report a lack of mental health expertise [35]. This seems to imply that, for substitution of mental health care to be successful in other countries, providing training to GPs in the field of mental health is even more important than in the Netherlands.

Strengths and limitations

The major strength of this case study is that we were able to carefully monitor the feasibility of an important Dutch policy change in a large, well-equipped primary health care center. In a natural experiment, we analyzed data that were systematically collected in a primary health care center. The observational nature of this study enabled us to observe the GPs' decisions on treatment allocation.

However, several limitations have to be considered. Our study was limited to one large primary health care center in the Netherlands that was well prepared to provide mental health care. The GPs participating in the study were probably more interested in or had more experience with mental health problems than other GPs. The policy change should be evaluated in a larger survey, including more practices and a larger variety of practices and GPs.

Patients were not randomly assigned to different treatment conditions in a trial but were in fact able to co-decide with their GP on further treatment. Therefore, our conclusions on improvement of symptoms after three months are only applicable to patients who are allocated by their GP to treatment in a naturalistic way. Patients may have had varying reasons to prefer treatment in a certain setting, for example in general practice, because of accessibility or financial benefits. Some other variables may have influenced treatment allocation, such as severity of psychological problems or motivation for treatment. These variables can also influence improvement of symptoms. We were only able to adjust analyses for some sources of bias, namely severity of symptoms at baseline, and the age and gender of the patients. Additionally, we do not know for all patients after what time and for how long they actually received the treatment that they were allocated to, especially if they were referred for treatment outside of

the general practice. It usually takes some time to start with treatment in mental health care. Some patients may have changed to a different treatment setting, but this is likely to only have occurred after our follow up measurement.

Mental health problems were assessed using the 4DSQ, which is a widely used and validated instrument to assess a broad range of psychological problems in primary care. It is not an instrument to directly assess psychiatric disorders. However, the 4DSQ can be used to distinguish between 'normal' distress and psychopathology [15-18].

The GP assessment was not complete for a relatively high number of patients. We assume that the GPs sometimes decided to not complete the assessment form if the problems were not severe; for example, to save time. Patients with missing scores were indeed mainly allocated to treatment in general practice. Therefore, we decided to base the policy recommended treatment allocation of these patients on just the 4DSQ. Only a third of all patients completed the follow-up measurement, and those patients were somewhat older and had relatively new symptoms at baseline compared to the patients who failed to complete the follow up measurement. This greatly limits the generalizability of our findings after three months. More improved patients might have been more motivated to complete the follow up assessment, resulting in an overly positive effect of treatment. We have only analyzed short-term outcomes. It is possible that the effects of not policy-concordant treatment will only become apparent after a longer period.

We tried to capture policy recommended treatment allocation with an algorithm using baseline assessment scores. Our interpretation of policy recommendations might have influenced the results of the study. Therefore, we performed sensitivity analyses with a more liberal interpretation of policy recommendations, forcing recommended treatment allocations to be more in line with actual treatment allocations. The results of these analyses were in line with the original analyses.

Conclusions

GPs working in large, well-equipped primary health care center make decisions on treatment allocation that are mainly in line with new Dutch policy aimed at substituting mental health care towards general practice. The outcomes of this study demonstrate the potential for substitution of mental health care towards primary care in optimal circumstances.

Acknowledgements
We would like to thank Marjolein Jansen for her contribution to the data collection of this study. We would also like to thank Gerrit Corporaal, Theo Franck, and Evert Mantel for introducing the researchers to the primary care center.

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Supplementary Table S1 Descriptive statistics of Dutch GP patients with mental health problems visiting a large primary health care center in 2014

	Total sample (n=408)		**Sample I: Table 3 (n=352)**		**Sample II: analyses (n=137)**	
Sex % (n)						
Male	34 (139)		32 (114)		32 (44)	
Female	66 (269)		68 (238)		68 (93)	
Mean age (SD)	45.0 (16.5)		44.6 (16.4)		47.5 (16.6)	
Mean 4DSQ scores (SD)	Mean	Standardized mean	Mean	Standardized mean	Mean	Standardized mean
Distress	18.6 (8.4)	5.8 (2.6)	18.5 (8.5)	5.8 (2.7)	19.4 (8.4)	6.0 (2.6)
Depression	3.4 (3.7)	2.9 (3.0)	3.4 (3.7)	2.9 (3.1)	3.7 (3.8)	3.1 (3.1)
Anxiety	5.5 (5.4)	2.3 (2.2)	5.6 (5.4)	2.3 (2.2)	5.9 (5.7)	2.5 (2.4)
Somatisation	11.6 (6.8)	3.6 (2.1)	11.5 (6.8)	3.6 (2.1)	11.4 (6.9)	3.6 (2.2)
4DSQ categories % (n)						
Distress						
Low	19 (78)		21 (74)		20 (27)	
Medium	31 (125)		34 (118)		30 (41)	
High	43 (175)		46 (160)		50 (69)	
Missing values	7 (30)		0		0	
Depression						
Low	49 (201)		54 (189)		51 (70)	
Medium	19 (76)		20 (70)		20 (28)	
High	25 (101)		26 (93)		28 (39)	
Missing values	7 (30)		0		0	

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-Supplementary Table S1 continued-

	Total sample (n=408)	Sample I: Table 3 (n=352)	Sample II: analyses (n=137)
4DSQ categories % (n)			
Anxiety			
Low	44 (181)	48 (170)	46 (63)
Medium	25 (103)	27 (95)	26 (36)
High	23 (94)	25 (87)	28 (38)
Missing values	7 (30)	0	0
Somatisation			
Low	46 (189)	510 (176)	50 (69)
Medium	36 (145)	39 (136)	38 (52)
High	11 (44)	11 (40)	12 (16)
Missing values	7 (30)	0	0
Risk of (self) harm % (n)			
Low	47 (192)	49 (171)	55 (75)
Medium	11 (45)	11 (40)	11 (15)
High	1 (5)	1 (5)	3 (4)
Missing values	41 (166)	39 (136)	31 (43)
Complexity % (n)			
Low	34 (140)	36 (125)	44 (60)
Medium	17 (69)	18 (63)	17 (23)
High	8 (33)	8 (28)	8 (11)
Missing values	41 (166)	39 (136)	31 (43)
Course of symptoms % (n)			
Good prognosis	24 (98)	26 (92)	35 (48)
Medium prognosis	27 (112)	27 (94)	24 (33)
Bad prognosis	8 (32)	9 (30)	9 (13)
Missing values	41 (166)	39 (136)	31 (43)

Supplementary Table S2 Results of linear regression analyses with changes in standardized 4DSQ scores of Dutch GP patients with mental health problems after three months: treatment allocation

	Distress		**Depression**		**Anxiety**		**Somatisation**	
	ß	**95%CI**	**ß**	**95%CI**	**ß**	**95%CI**	**ß**	**95%CI**
Gender (reference: male)	0.567	-0.278 to 1.412	0.545	-0.261 to 1.352	0.146	-0.417 to 0.708	0.156	-0.397 to 0.710
Age	-0.010	-0.034 to 0.015	-0.011	-0.034 to 0.012	-0.010	-0.026 to 0.006	-0.005	-0.021 to 0.011
Baseline 4DSQ	-0.382*	-0.543 to -0.222	-0.610*	-0.733 to -0.486	-0.383*	-0.508 to -0.257	-0.302*	-0.425 to -0.179
Treatment allocation (reference: general practitioner treatment)								
Mental health nurse	-0.152	-1.126 to 0.823	-0.263	-1.181 to 0.655	-0.509	-1.150 to 0.133	-0.646	-1.273 to -0.020
Basic mental health care	-0.452	-1.750 to 0.846	0.182	-1.020 to 1.384	-0.429	-1.323 to 0.464	-0.777	-1.602 to 0.049
Specialized mental health care	-0.209	-1.829 to 1.412	-0.688	-2.250 to 0.874	-0.704	-1.838 to 0.429	0.310	-0.744 to 1.363

Notes: ß=regression coefficient. 95%CI=95% confidence interval. *=Significant ($p<0.01$) effect. Standardized 4DSQ scores were analyzed for comparability between scales.

Supplementary Table S3 Results of linear regression analyses with changes in standardized 4DSQ scores of Dutch GP patients with mental health problems after three months: policy-concordant treatment

	Distress		**Depression**		**Anxiety**		**Somatisation**	
	ß	**95%CI**	**ß**	**95%CI**	**ß**	**95%CI**	**ß**	**95%CI**
Gender (reference: male)	0.532	-0.307 to 1.370	0.568	-0.238 to 1.374	0.154	-0.407 to 0.715	0.169	-0.397 to 0.734
Age	-0.010	-0.034 to 0.014	-0.010	-0.033 to 0.013	-0.009	-0.025 to 0.007	-0.005	-0.021 to 0.011
Baseline 4DSQ	-0.428*	-0.589 to -0.267	-0.631*	-0.758 to -0.505	-0.419*	-0.534 to -0.304	-0.324*	-0.453 to -0.195
Policy-concordant treatment (reference: policy-concordant)								
Less specialized than recommended	-0.407	-1.659 to 0.845	-0.511	-1.696 to 0.675	-0.007	-0.838 to 0.825	0.063	-0.898 to 0.771
More specialized than recommended	0.263	-0.581 to 1.107	-0.033	-0.781 to 0.847	0.372	-0.188 to -0.932	0.083	-0.487 to 0.654

Notes: ß=regression coefficient. 95%CI=95% confidence interval. *=Significant (p<0.01) effect. Standardized 4DSQ scores were analyzed for comparability between scales.

Supplementary Table S4 Sensitivity analyses: treatment allocation recommended by Dutch mental health policy

Treatment allocation	Patients that should be treated in the setting according to policy	Original analyses	Sensitivity analyses
General practitioner	Patients without a psychiatric disorder, non-complex problems, low risk, and new symptoms	(Low or medium scores on each of the four 4DSQ dimensions) AND (low scores on complexity, risk, and course)	(Low scores on each of the four 4DSQ dimensions, risk, complexity, and course) OR (not more than one medium score on complexity, risk, course or 4DSQ scores)
Mental health nurse	Patients without a psychiatric disorder, but with somewhat more (complex) problems	(A medium score on either complexity, risk, or course) OR (a high score on 4DSQ distress) OR (a medium score on either 4SDQ anxiety, depression, or somatisation)	(A high score on 4DSQ distress) OR (a high score on 4DSQ somatisation) OR (at least two medium scores on either complexity, risk, course, or 4DSQ dimensions)
Basic mental health care (short term care)	Patients with a (suspected) psychiatric disorder	A high score on either 4DSQ anxiety, depression, or somatisation	A high score on either 4DSQ anxiety or depression

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-Supplementary Table S4 continued-

Treatment allocation	Patients that should be treated in the setting according to policy	Original analyses	Sensitivity analyses
Specialized care	Patients with high risk, highly complex problems, or recurrent symptoms	A high score on either complexity, risk, or course	(A high score on either complexity, risk, or course) AND (a high score on either 4DSQ anxiety, depression, or somatisation)

Notes: Risk=risk of (self) harm. The GP assessment was not complete for all patients (see results section). For these patients, policy recommended treatment was based on the 4DSQ only; GP treatment when all 4DSQ dimensions were low; mental health nurse treatment when at least one 4DSQ dimension was medium; basic mental health care when at least one score on anxiety, depression or somatisation was high; and specialized care when at least two scores on anxiety, depression, or somatisation were high. For the sensitivity analyses, these rules were changed to: GP treatment when not more than one 4DSQ dimension was medium; mental health nurse when at least two 4DSQ dimensions were medium; basic mental health care when at least one of depression or anxiety was high. Specialized health care remained unchanged, because this rule was already quite strict and was difficult to change.

Supplementary Table S5 Sensitivity analyses: actual versus policy recommended treatment allocation of Dutch GP patients with mental health problems visiting a large primary health care center

	Actual treatment allocation				
Treatment allocation recommended by policy	GP	Mental health nurse	Basic MHC	Specializ. MHC	**Total**
GP	53	37	4	3	**97**
Mental health nurse	36	65	19	3	**123**
Basic MHC	9	42	34	1	**86**
Specialized MHC	8	12	11	15	**46**
Total	**106**	**156**	**68**	**22**	**352**

Policy-concordant treatment allocation (n=167; 47%)
More specialized treatment than allowed by policy (n=67; 19%)
Less specialized treatment than allowed by policy (n=118; 34%)

Notes: GP=general practitioner. MHC=mental health care.

6

Applying computerized adaptive testing to the Four-Dimensional Symptom Questionnaire (4DSQ): a simulation study

Magnée T, de Beurs DP, Terluin B, Verhaak PF. Applying computerized adaptive testing to the Four-Dimensional Symptom Questionnaire (4DSQ): a simulation study. JMIR Mental Health. 2017;4(1),e7.

Abstract

Background
Efficient screening questionnaires are useful in general practice. Computerized adaptive testing (CAT) is a method to improve the efficiency of questionnaires, as only the items that are particularly informative for a certain responder are dynamically selected.

Objective
The objective of this study was to test whether CAT could improve the efficiency of the Four-Dimensional Symptom Questionnaire (4DSQ), a frequently used self-report questionnaire designed to assess common psychosocial problems in general practice.

Methods
A simulation study was conducted using a sample of Dutch patients visiting a general practitioner (GP) with psychological problems (n=379). Responders completed a paper-and-pencil version of the 50-item 4DSQ and a psychometric evaluation was performed to check if the data agreed with item response theory (IRT) assumptions. Next, a CAT simulation was performed for each of the four 4DSQ scales (distress, depression, anxiety, and somatization), based on the given responses as if they had been collected through CAT. The following two stopping rules were applied for the administration of items: (1) stop if measurement precision is below a predefined level, or (2) stop if more than half of the items of the subscale are administered.

Results
In general, the items of each of the four scales agreed with IRT assumptions. Application of the first stopping rule reduced the length of the questionnaire by 38% (from 50 to 31 items on average). When the second stopping rule was also applied, the total number of items could be reduced by 56% (from 50 to 22 items on average).

Conclusions
CAT seems useful for improving the efficiency of the 4DSQ by 56% without losing a considerable amount of measurement precision. The CAT version of

the 4DSQ may be useful as part of an online assessment to investigate the severity of mental health problems of patients visiting a GP. This simulation study is the first step needed for the development a CAT version of the 4DSQ. A CAT version of the 4DSQ could be of high value for Dutch GPs since increasing numbers of patients with mental health problems are visiting the general practice. In further research, the results of a real-time CAT should be compared with the results of the administration of the full scale.

Introduction

General practitioners (GPs) are often the first point of contact for persons with mental health problems, and they make important decisions about treatment and referrals. However, GPs vary in their ability to detect mental problems in patients during consultations [1] and may have difficulties distinguishing between "normal" psychological distress and psychopathology [2]. Moreover, time pressure in general practice is increasing.

Using a short, good quality screener to distinguish between mild psychological symptoms and severe disorders has become of particular importance for Dutch GPs, as they have been restricted to refer only patients with a Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) disorder [3] to mental health care professionals.

The Four-Dimensional Symptom Questionnaire (4DSQ) is a frequently used self-report questionnaire designed to assess common psychosocial problems in general practice [4]. It consists of four subscales measuring distress, depression, anxiety, and somatization. The 4DSQ is available in Dutch, English, and several other languages and has been widely used and validated in clinical practice. The full version of the 4DSQ comprises 50 items. It has been found that most responders need 7 minutes to complete the full version and 75% of all responders complete the 4DSQ within 10 minutes [4]. Responses to the questionnaire can be used to distinguish between patients with "normal" psychological distress and patients with psychopathology [5-7]. This is of increasing importance for GPs who have to make crucial decisions about the triage of patients with mental health problems.

Computerized adaptive testing (CAT) is a method to reduce patient burden of traditional questionnaires, by letting a computer dynamically select only the items that give new information about the patient. Based on a patient's answer to a single first item, a responders underlying trait (e.g., level of depression) is estimated. In addition, an automated algorithm selects the next item that is most appropriate or informative for this responder. The benefit of using CAT is the reduction in items without a loss in reliability or precision in measurement [8].

CAT relies on item response theory (IRT) [9]. A CAT version of the Center for Epidemiologic Studies-Depression (CES-D) scale, one of the most widely used depression screeners, provided only marginally different outcomes with a decreased number of items compared to the full version [10]. CAT has also been applied successfully to other mental health questionnaires, such as the Beck Depression Inventory [11], the Beck Scale for Suicide Ideation [12], and the 90-item Mood and Anxiety Symptom Questionnaire [13] and seems more accurate than a simple short-form version of an assessment [14]. It is not clear yet if the efficiency of screening for common mental health problems in general practice can be increased by developing an adaptive version of the 4DSQ.

The aims of this simulation study were (1) to investigate if responses of a clinical sample to a paper-and-pencil version of the 4DSQ meet the psychometric requirements needed for IRT; and (2) to determine if a simulated adaptive version of the 4DSQ would yield inferences similar to those based on the full version of the 4DSQ. This simulation study is the first step necessary for the development of a CAT version of the 4DSQ.

Methods

Participants

We used data collected in the baseline measurement of a study evaluating triage decisions in general practice. All patients with mental health problems visiting a GP working in a primary care center in the northern part of the Netherlands between January 1 and December 31, 2014 were included in the study (n=408). All included participants provided informed consent. Participants filled in the Dutch paper-and-pen version of the 4DSQ and only patients with complete data were included in the analyses (92.9%). As a

result, our final sample consisted of 379 participants with a mean age of 44.8 years (SD=16.5, range 16 to 87). Of the participants, 66.8% (n=253) were female. No significant differences in age (p=0.715) or sex (p=0.205) were found between responders with complete and without complete data.

Psychometric Evaluation

Since all four of the 4DSQ scales are used and interpreted separately, we performed the psychometric evaluation and our analyses for each of the four scales separately. We followed the five steps described in the analysis plan used for the PROMIS study, which was aimed at improving patient-reported outcome instruments [8].

Step 1: Descriptive Statistics

Descriptive statistics were calculated for each single item (Multimedia Appendix 2). The 4DSQ consists of questions about complaints and symptoms that occurred during the previous week, such as "During the past week, did you feel tense?" Responders indicated how often they experienced these symptoms by answering "no," "sometimes," "regularly," "often," or "very often or constantly." According to the scoring protocol, responses were coded as 0 (no), 1 (sometimes), 2 (regularly, often, or very often/constantly). The four 4DSQ scales vary in the total number of items: 16 items for distress, 6 for depression, 12 for anxiety, and 16 for somatization. A total score was calculated for each scale by adding up all item scores. To examine internal consistency, Cronbach alpha was calculated for each scale, with .8 as the acceptable minimum. We analyzed whether removing any of the items changed the internal consistency of a scale.

Step 2: Evaluate Item Response Theory Assumptions

Within IRT, data have to agree with three basic assumptions: unidimensionality, local independency, and monotonicity [8].

Unidimensionality means that a person's response to an item is accounted for by his or her level on the underlying trait and not by any other factor. A confirmatory factor analysis (CFA) with ordinal data was performed to study unidimensionality for each scale. The model's fit was assessed using four frequently used fit indices: comparative fit index (CFI) greater than 0.95 for good fit, root mean square error of approximation (RMSEA) less than 0.06 for good fit, Tucker Lewis index (TLI) greater than

0.95 for good fit, and standardized root mean residuals (SRMR) less than 0.08 for good fit.

Local independence means that there should be no significant association among item responses, except for the association controlled for by the underlying trait. This assumption was checked by inspecting residual correlations between item pairs within the CFA. Items with high residual correlations (greater than 0.2) were considered as possibly locally dependent.

The assumption of monotonicity means that an item response related to a higher level of the trait should increase with the level of the trait. This assumption was studied by plotting trace lines. In addition, we studied scalability coefficients of IRT probability curves (greater than 0.3 indicates monotonicity).

Step 3: Graded Response Model Fit

Within IRT, several models are commonly used; however, because of the ordered-response categories of the 4DSQ, a graded response model (GRM) was preferred for our data [15]. This model estimates at which levels of an underlying trait (θ), such as depression, a person is likely to choose one of the response options of an item. For each single item, several GRM parameters are estimated. The discrimination parameter (α) represents the extent to which an item discriminates between different trait levels. An item with a high alpha is strongly associated with the measured construct. Two difficulty or threshold parameters ($ß_1$ and $ß_2$) were also estimated. A category response curve (CRC), based on the estimated parameters, was plotted for each item to evaluate the fit of the model to the data.

Step 4: Differential Item Functioning

An item displays differential item functioning (DIF) if persons with different characteristics (e.g., males and females) respond differently to an item, despite equivalent levels of the underlying trait [8]. Items showing DIF may bias CAT outcomes. To check for DIF (uniform and non-uniform), GRM estimates of each item were compared between subgroups varying in gender (male or female) and age (R^2 less than .03 indicating no DIF).

Step 5: Simulated Computerized Adaptive Testing

The GRM parameter estimates from Step 3 were used for a CAT simulation. As no information on a subject is available before the first item is administered, θ is initially set at 0. After the first item is answered, the choice for the next item is based on the GRM parameters of all potential next items in relation to the response to the item that was answered first. All optimal next items are selected based on the maximum Fisher estimation method. The CAT selects new items until a pre-defined stopping rule is reached. A stopping rule is based on either a maximum number of items administered or on a pre-specified level of measurement precision [10-13].

We combined the two following stopping rules: (1) stop when the standard error of the trait is similar to the standard error of the full lengths scale, or (2) stop when half the number of the full scale is administered. We compared CAT outcomes with the first stopping rule only and with both stopping rules. Regarding the first stopping rule, we inspected varying levels of standard error (from 0.2 to 0.8). The predefined standard error of theta that corresponded with the standard error of the full scale was used as a reference point. Correlations were calculated between trait levels based on CAT and on the scores from the full version of the 4DSQ. We added a second stopping rule because questionnaires in mental health often are most informative for patients with relatively high levels of clinical outcomes [10,16,17]. For patients with a low level of the assessed outcome (eg, patients with low levels of depression), many items provide little (additional) information. Ironically, as the CAT algorithm finds it difficult to estimate the standard error when items offer little information, patients with a low trait level often have to answer all items, even though they provide no new information.

Software

The descriptive statistics and the estimation of the GRM parameters were done in STATA 14.0. The CFA model was estimated using the lavaan package in R [18,19]. Monotonicity was checked using the R mokken package [20] and DIF with the R lordif package [21]. The CAT simulation was done with the CatIRT package in R [22].

Results

Step 1: Descriptive Statistics

The sample's mean total score on the 4DSQ distress scale was 18.6 (SE 0.43, range 0-32, median 20), with an overall Cronbach alpha of .92. The mean depression score was 3.4 (SE 0.20, range 0-12, median 2), with a Cronbach alpha of .90. The mean score for anxiety was 5.5 (SE 0.27, range 0-23, median 4), with a Cronbach alpha of .87. Finally, for the somatization scale, the sample scored 11.6 on average (SE 0.35, range 0-32, median 11), with a Cronbach alpha of .85. These results were comparable to other studies [4,7]. The descriptive statistics of the single items on the four scales are shown in Supplementary Tables S1-S4. Removing any one of the items did not change the internal consistency of any of the four scales.

Step 2: Checking Item Response Theory Assumptions

Regarding the first assumption, unidimensionality, we concluded that the items of the anxiety scale showed a good model fit for all four fit indices of the CFA. The items of the distress and depression scales showed a good fit for three of the four indices, but not for RMSEA, although they nearly did. For good fit, RMSEA should be lower than 0.06, but it was 0.08 (distress) and 0.07 (depression). The items of the somatization scale showed good fit for two out of four indices, but not for RMSEA (0.07 instead of less than 0.06) and TLI (0.94 instead of greater than 0.95).

Regarding the second assumption, out of 321 items pairs within the four scales (equation 1), two item pairs with a residual correlation above 0.2 were observed, indicating local independency. They were items 20 and 39 (sleep-related), and items 47 and 48 (trauma-related), all from the distress scale.

$$321=(½)(6)(5) + (½)(16)(15) + (½)(12)(11) + (½)(16)(15) \quad (1)$$

The scalability coefficient of all items was higher than 0.3, indicating that all items met the third assumption of monotonicity.

Step 3: Graded Response Model Fit

The parameter estimates of the GRM for all items of the four scales are shown in Supplementary Tables S5-S8. Item 33 ("would be better off dead") of the depression scale showed the highest alpha (7.377) and discriminates best between persons with low and high levels of depression. For the three other scales, the highest alphas were observed for item 37 (3.483, distress, "no longer feel like doing anything"), item 27 (5.527, anxiety, "feel frightened"), and item 16 (1.855, somatization, "pain in the chest"). All other items showed an alpha above 1, except for items 47 and 48 (distress), item 50 (anxiety), and items 6 and 8 (somatization).

It was found that 43 items showed CRCs as expected. Five items on the anxiety scale (40, 42, 43, 49, and 50) and two items on the somatization scale (5 and 14) did not show CRCs as expected. For those items, the probability to answer "sometimes" was always lower than the probability for one of the other responses, regardless of the trait level.

As an example, Figure 1 shows the CRCs of the items with the highest (item 33; α=7.377, ß$_1$=0.688, ß$_2$=1.349) and lowest (item 35; α=2.457, ß$_1$=0.119, ß$_2$=0.828) discrimination parameter (α) of the depression scale. The higher discrimination parameter of item 33 indicates an ability to demarcate fine gradations between persons with similar levels of depression. This can be observed in Figure 1, which shows steep curves for different answer categories for item 33. Item 35 (no escape from situation) is more easily endorsed than item 33 in general (would be better off dead), which is indicated by the location of the curves more on the left side of the graph. Persons with a high depression level are most likely to answer "sometimes" to item 33, and to answer "regularly", "often," or "very often or constantly" to item 35.

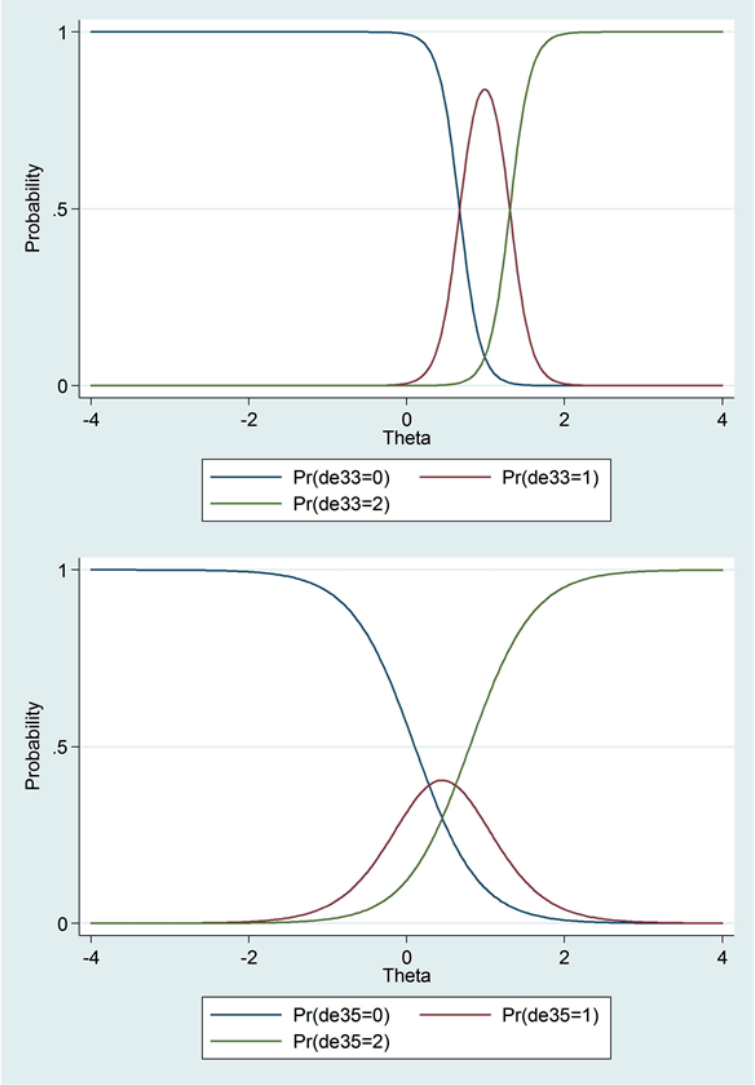

Figure 1 Category response curves of items 33 and 35 of the Four-Dimensional Symptom Questionnaire depression scale. Notes: the probability (y-axis) represents the chance on a certain response (0=never; 1=sometimes; 2=regularly, often, very often, or constantly), given a certain level of theta. Theta (x-axis) represents the underlying trait level; in this figure, depression. The abbreviation Pr is probability.

Step 4: Differential Item Functioning

For the depression, anxiety, and somatization subscales, no items showed DIF. The only item that showed significant and relevant uniform and non-uniform DIF was item 41 ("I quickly get emotional") from the distress scale for the covariate gender.

Step 5: Simulated Computerized Adaptive Testing

The characteristics of the simulated CAT under different levels of measurement precision (allowing the standard error of the estimated underlying trait to gradually increase; stopping rule 1) are shown in Table 1. For each scale, the standard error of theta that was equal to the standard error of the full version scale is indicated. For example, the standard error of the full version scale of distress was 0.4. When allowing the standard error of theta to be maximal 0.4, the mean number of items administered could be decreased from 16 to 6.3. The correlation between the distress level based on 6.3 items and the distress level based on all items was high (0.96). Comparable results were found for the three other scales. With the first stopping rule, we were able to reduce the mean number of items administered to 5 for depression (from 6), to 8.3 for anxiety (from 12), and to 12.9 for somatization (from 16), while correlations between CAT and full test scores remained high. Applying CAT with the first stopping rule to all four scales could reduce the total number of 4DSQ items from 50 to, on average, 34 items.

The results of combining the first stopping rule with the second stopping rule are shown in Table 2. For distress, the average number of items could be further decreased from 6.3 to 5, but the correlation also decreased from 0.96 to 0.79. Therefore, we did not apply the second stopping rule to this scale. For the three other scales, the number of average items could be decreased, while the correlation remained high. Overall, when applying the CAT with both stopping rules (except for distress), the 4DSQ could be reduced from 50 to 22 items.

Table 1 Mean number of items administered under varying levels of measurement precision and correlations between computerized adaptive testing scores and full version scores of the Four-Dimensional Symptom Questionnaire

Stopping rule	Distress		Depression		Anxiety		Somatization	
	Number of items, mean (SD)	Correlation[a]	Number of items, mean (SD)	Correlation	Number of items, mean (SD)	Correlation	Number of items, mean (SD)	Correlation
None	16	1.00	6	1.00	12	1.00	16	1.00
SE[b] (θ)<0.2	15.7 (0.8)	1	5.7 (0.9)[c]	1[c]	12 (0)	1	16 (0)	1
SE (θ)<0.3	8.8 (4.5)	0.98	5.4 (1.2)	0.99	8.7 (4.3)[c]	0.97[c]	14 (0)	0.97
SE (θ)<0.4	6.3 (4.3)[c]	0.96[c]	5.0 (1.3)	0.99	8.3 (4.3)	0.97	12.9 (2.1)[c]	0.95[c]
SE (θ)<0.5	4.9 (3.8)	0.92	4.9 (1.4)	0.99	8.1 (4.4)	0.97	11.2 (4.9)	0.95
SE (θ)<0.6	4.1 (2.6)	0.86	4.6 (1.4)	0.99	5.9 (4.2)	0.94	7.5 (4.6)	0.86
SE (θ)<0.7	3.8 (2.5)	0.84	3.9 (1.3)	0.97	5.9 (4.1)	0.94	4.6 (3.4)	0.73
SE (θ)<0.8	3.7 (2.3)	0.79	3.9 (1.3)	0.97	5.6 (4.0)	0.93	4.6 (3.4)	0.73

Notes: [a]Correlation between CAT θ and complete test θ. [b]SE: standard error. [c]The standard error of theta (θ) is equal to the standard error of the full version scale.

Table 2 Mean number of items administered and correlation with total estimated theta under one or two stopping rules

Stopping rule	Distress		Depression		Anxiety		Somatization	
	Number of items, mean (SD)	Correlation[a]	Number of items, mean (SD)	Correlation	Number of items, mean (SD)	Correlation	Number of items, mean (SD)	Correlation
None	16	1.00	6	1.00	12	1.00	16	1.00
SE[b] (θ) = SE (full)	6.3 (4.3)	0.96	5.4 (1.2)[c]	0.99	8.7 (4.3)	0.97	12.9 (2.1)	0.95
Maximum items[c]	5.0 (2.1)	0.79	3.0 (0)	0.96	4.9 (1.4)	0.92	7.9 (0.3)	0.92

Notes: [a]Correlation between CAT θ and complete test θ. [b]SE: standard error. [c]Maximum items are determined by dividing the number of items by 2.

Discussion

Principal findings

In summary, when applying CAT to the 4DSQ and applying two stopping rules to the subscales of anxiety, depression, somatization, and one stopping rule to the subscale distress, the total number of items on the 4DSQ could be reduced by 56% on average (from 50 to 22 items), without losing a considerable amount of measurement precision.

Interpretation

Our simulation study showed that CAT may increase the efficiency of the 4DSQ and could reduce responders' burden by more than 50%. These results were also found in other CAT studies, such as on the Center for Epidemiological Studies-Depression Scale (CES-D), where the total scale of 20 items could be reduced to 7 items [23].

Some CATs to measure anxiety and depression have already been used and evaluated in clinical (specialist) care [24-26]. These CATs appeared to be useful for longitudinal monitoring of symptoms, since they were as reliable over time as traditional questionnaires [27].

A CAT version of the 4DSQ seems especially useful in general practices, for example, as part of a broad online assessment to investigate the severity of psychological problems of patients. As the number of patients visiting their GP with mental health problems is increasing [28], there is a growing need for an efficient screener for mental health problems. Many Dutch GPs already use the 4DSQ. An efficient, shortened 4DSQ could be combined with other mental health questionnaires, while keeping responders' burden as low as possible. GPs have only a limited time and often have to make important decisions about referring patients with mental health problems. An online severity assessment, ideally preceding the first consultation, could be helpful as a first quick evaluation on which to base further (treatment) decisions. Some GPs use the 4DSQ as an agenda-setting tool to talk about the psychological problems of their patients. An online assessment could fulfill the same agenda-setting function.

However, some obstacles for the successful implementation of a CAT version of the 4DSQ in general practice exist. First, current information and communication technology (ICT) possibilities in general practices are insufficient for the implementation of CAT, which requires sophisticated

statistical software. Second, it is not clear to what extent GPs are willing to implement a CAT version of the 4DSQ. GPs may use responses from individual 4DSQ items, such as item 47 or 48 on traumatic events, for a quick clinical evaluation, and this information may be lost when applying CAT. Lastly, it is not clear if CAT is appropriate for all patients. Previous research on CAT after inpatient rehabilitation suggests that it might only be feasible to collect (complete) data for a specific subset of patients [29]. Some patients may prefer a paper-and-pencil version of a questionnaire to an online assessment. Although a CAT version of the 4DSQ might not be immediately available for use in clinical practice, some studies have already shown that CAT versions of traditional questionnaires can be used in a clinical setting [24-26] and are well accepted by patients [25]. Recently developed, free-to-use online CAT platforms [30,31] are likely to enable the development of new CAT questionnaires. Moreover, some Dutch GPs already have been using an online screener to assess mental health problems, so application of a CAT version of the 4DSQ in clinical practice may be within reach.

Strengths and limitations

As this was a simulation study, we used responses to a paper-and-pencil version of the 4DSQ. In reality, responders might behave differently when receiving a computerized adaptive assessment. For example, we do not know if the actual computer administration might influence responses or what effect differences in the item order may have. However, a previous study showed that differences between results from a simulation CAT and a real CAT were small [32]. We used data from a sample from a northern region of the Netherlands, but parameter estimates based on data from different regions and countries might also differ.

Regarding the psychometric evaluation, our data showed some weaknesses. For most items of the four subscales of the 4DSQ, the assumptions for an IRT analysis were met. The assumption of unidimensionality was not met perfectly for all four scales, although it nearly was. Moreover, some items showed other limitations, such as correlations between item pairs or differential item functioning. These items might be left out in future (real-time) CAT versions of the 4DSQ. As in other studies, we found relevant DIF for the item "emotionality" on the distress scale. Women tend to more easily agree with this item compared to men, even when they have a similar underlying level of distress. When looking at

the individual responses to the CAT of the distress scale, the item "emotionality" was only administered to participants with a very low level of distress. This indicates that the DIF on this item does not bias the CAT outcomes, as this item is not informative enough to be included in the final CAT. When looking at the distribution and the CRC of some items of the anxiety and somatization scales, participants either endorse option 0 or option 1 to 2. Patients apparently have difficulties differentiating between response categories 1 and 2. This might be solved in future studies by grouping response options 1 and 2 for certain items, making them dichotomous.

Conclusions

Data from this simulation study in general agreed with assumptions needed for CAT. CAT seems useful for improving the efficiency of the 4DSQ by 56%, without losing a considerable amount of measurement precision. Of course, this simulation study is only the first step towards a CAT version of the 4DSQ that could be implemented in clinical practice and it should be followed by a study on a real-time CAT and eventually by an evaluation of the developed CAT version in a clinical setting.

Acknowledgments

We would like to thank Marjolein Jansen and Thomas de Kok for their contributions to the data collection.

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Supplementary Table S1 Descriptive statistics of single items on the 4DSQ distress scale

Item #	Item	Answer category			Mean (SD)	Cronbach's α after removing this item
		0	1	2		
17	Feeling down or depressed	84	113	183	1.26 (0.80)	0.91
19	Worry	31	78	271	1.63 (0.63)	0.92
20	Disturbed sleep	66	100	214	1.39 (0.77)	0.91
22	Lack of energy	80	106	194	1.30 (0.80)	0.91
25	Tense	43	90	247	1.54 (0.69)	0.91
26	Easily irritated	75	117	188	1.30 (0.78)	0.91
29	Can't do anything anymore	117	117	146	1.08 (0.83)	0.91
31	No longer any interest	167	114	99	0.82 (0.82)	0.91
32	Can't cope anymore	125	127	128	1.01 (0.82)	0.91
36	Can't face it anymore	135	126	119	0.96 (0.82)	0.91
37	No longer feel like doing anything	106	134	140	1.09 (0.80)	0.91
38	Have difficulty in thinking clearly	112	131	137	1.07 (0.81)	0.91
39	Have difficulty in getting to sleep	116	112	152	1.09 (0.84)	0.92
41	Easily become emotional	84	114	182	1.26 (0.80)	0.91
47	Fleeting images of upsetting event(s)	134	135	111	0.94 (0.80)	0.92
48	Do your best to put aside thought about upsetting event(s)	157	112	111	0.88 (0.83)	0.92

Supplementary Table S2 Descriptive statistics of single items on the 4DSQ depression scale

Item #	Item	Answer category			Mean (SD)	Cronbach's α after removing this item
		0	1	2		
28	Everything meaningless	186	97	97	0.77 (0.83)	0.88
30	Life is not worth while	237	80	63	0.54 (0.76)	0.87
33	Would be better off dead	290	59	31	0.32 (0.62)	0.88
34	Can't enjoy anything anymore	165	114	101	0.83 (0.82)	0.89
35	No escape from situation	205	84	91	0.70 (0.83)	0.89
46	Think I wish I were dead	300	53	27	0.28 (0.59)	0.88

Supplementary Table S3 Descriptive statistics of single items on the 4DSQ anxiety scale

Item #	Item	Answer category			Mean (SD)	Cronbach's α after removing this item
		0	1	2		
18	Sudden fright for no reason	233	84	63	0.55 (0.76)	0.87
21	Vague feeling of fear	146	100	134	0.97 (0.86)	0.86
23	Trembling when with other people	278	61	41	0.38 (0.67)	0.86
24	Anxiety or panic attacks	249	80	51	0.48 (0.72)	0.86
27	Frightened	168	106	106	0.84 (0.83)	0.85
40	Fear of going out of the house alone	294	46	40	0.33 (0.66)	0.86
42	Afraid of anything no need for	277	46	57	0.42 (0.74)	0.87
43	Afraid to travel on buses or other	320	35	25	0.22 (0.55)	0.87
44	Afraid of becoming embarrassed when with other people	233	97	50	0.52 (0.72)	0.87
45	Threatened by unknown danger	305	46	29	0.27 (0.59)	0.86
49	Avoid certain places because they frightened you	313	36	31	0.26 (0.59)	0.87
50	Repeat some actions a number of times	304	47	29	0.28 (0.59)	0.87

Supplementary Table S4 Descriptive statistics of single items on the 4DSQ somatization scale

Item #	Item	Answer category			Mean (SD)	Cronbach's α after removing this item
		0	1	2		
1	Dizziness or feeling light-headed	115	169	96	0.95 (0.74)	0.84
2	Painful muscles	130	98	152	1.06 (0.86)	0.84
3	Fainting	364	15	1	0.04 (0.22)	0.85
4	Neck pain	156	102	122	0.91 (0.85)	0.84
5	Back pain	157	91	132	0.93 (0.87)	0.84
6	Excessive sweating	164	113	103	0.84 (0.82)	0.85
7	Palpitations	179	116	85	0.75 (0.80)	0.84
8	Headache	90	129	161	1.19 (0.79)	0.85
9	A bloated feeling in the abdomen	178	115	87	0.76 (0.80)	0.84
10	Blurred vision or spots in front of eyes	186	114	80	0.72 (0.79)	0.84
11	Shortness of breath	241	83	56	0.51 (0.74)	0.84
12	Nausea or an upset stomach	172	121	87	0.78 (0.80)	0.84
13	Pain in the abdomen or stomach area	199	104	77	0.68 (0.79)	0.84
14	Tingling in the fingers	257	70	53	0.46 (0.73)	0.84
15	Pressure of tight feeling in the chest	206	101	73	0.65 (0.78)	0.84
16	Pain in the chest	278	68	34	0.36 (0.64)	0.84

Supplementary Table S5 Estimated GRM parameters of the 4DSQ distress scale items

Item #	Item	α	(SE)	ß1	(SE)	ß2	(SE)
17	Feeling down or depressed	2.516	0.254	-0.935	0.096	0.046	0.076
19	Worry	2.367	0.273	-1.736	0.150	-0.702	0.088
20	Disturbed sleep	1.208	0.150	-1.623	0.198	-0.274	0.110
22	Lack of energy	2.190	0.225	-1.008	0.106	-0.034	0.080
25	Tense	2.109	0.231	-1.567	0.142	-0.511	0.086
26	Easily irritated	1.545	0.169	-1.277	0.141	0.009	0.094
29	Can't do anything anymore	3.122	0.321	-0.572	0.078	0.329	0.074
31	No longer any interest	2.209	0.225	-0.191	0.081	0.805	0.097
32	Can't cope anymore	2.947	0.299	-0.516	0.078	0.475	0.078
36	Can't face it anymore	3.057	0.308	-0.423	0.076	0.541	0.079
37	No longer feel like doing anything	3.483	0.359	-0.640	0.078	0.366	0.073
38	Have difficulty in thinking clearly	1.770	0.181	-0.762	0.104	0.474	0.096
39	Have difficulty in getting to sleep	1.107	0.136	-0.944	0.150	0.427	0.125
41	Easily become emotional	1.760	0.184	-1.075	0.120	0.060	0.088
47	Fleeting images of upsetting event(s)	0.827	0.121	-0.878	0.180	1.177	0.214
48	Do your best to put aside thought about upsetting event(s)	0.992	0.131	-0.443	0.134	1.043	0.174

Notes: α is the discrimination parameter. ß 1en ß2 represent the location or difficulty parameters. SE is the standard error of the estimated parameter.

Supplementary Table S6 Estimated GRM parameters of the 4DSQ depression scale items

Item #	Item	α	(SE)	ß1	(SE)	ß2	(SE)
28	Everything meaningless	3.499	0.414	-0.018	0.067	0.709	0.079
30	Life is not worth while	6.203	0.995	0.325	0.062	0.941	0.083
33	Would be better off dead	7.377	1.619	0.688	0.071	1.349	0.112
34	Can't enjoy anything anymore	2.346	0.261	-0.207	0.079	0.741	0.093
35	No escape from situation	2.457	0.281	0.119	0.074	0.828	0.096
46	Think "I wish I were dead"	6.293	1.227	0.777	0.076	1.440	0.128

Notes: α is the discrimination parameter. ß 1en ß2 represent the location or difficulty parameters. SE is the standard error of the estimated parameter.

Supplementary Table S7 Estimated GRM parameters of the 4DSQ anxiety scale items

Item #	Item	α	(SE)	ß1	(SE)	ß2	(SE)
18	Sudden fright for no reason	1.369	0.170	0.448	0.105	1.554	0.178
21	Vague feeling of fear	3.886	0.479	-0.303	0.070	0.432	0.069
23	Trembling when with other people	1.874	0.233	0.841	0.102	1.689	0.164
24	Anxiety or panic attacks	2.226	0.255	0.508	0.083	1.400	0.127
27	Frightened	5.527	0.822	-0.140	0.063	0.633	0.070
40	Fear of going out of the house alone	2.032	0.264	0.982	0.106	1.644	0.157
42	Afraid of anything no need for	1.653	0.212	0.872	0.112	1.487	0.160
43	Afraid to travel on buses or other	1.481	0.228	1.536	0.180	2.342	0.283
44	Afraid of becoming embarrassed when with other people	1.323	0.166	0.479	0.108	1.853	0.208
45	Threatened by unknown danger	2.077	0.277	1.108	0.112	1.875	0.177
49	Avoid certain places because they frightened you	1.941	0.272	1.242	0.127	1.880	0.187
50	Repeat some actions a number of times	0.961	0.172	1.689	0.269	2.964	0.474

Notes: α is the discrimination parameter. ß 1en ß2 represent the location or difficulty parameters. SE is the standard error of the estimated parameter.

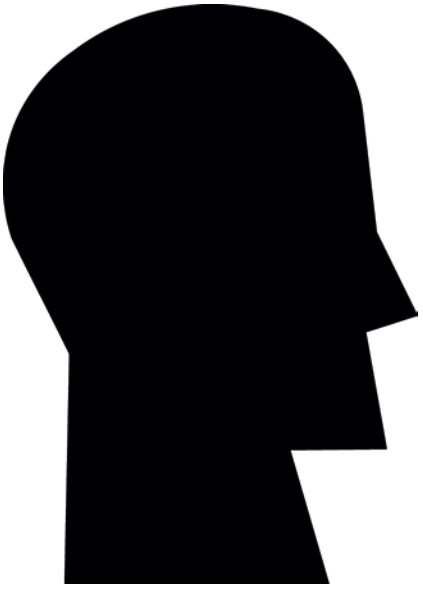
Supplementary Table S8 Estimated GRM parameters of the 4DSQ somatization scale items

Item #	Item	α	(SE)	ß1	(SE)	ß2	(SE)
1	Dizziness or feeling light-headed	1.345	0.161	-0.832	0.128	1.067	0.142
2	Painful muscles	1.431	0.177	-0.622	0.114	0.387	0.105
3	Fainting	1.299	0.337	2.940	0.557	5.217	1.297
4	Neck pain	1.327	0.166	-0.338	0.109	0.776	0.126
5	Back pain	1.480	0.180	-0.316	0.102	0.611	0.111
6	Excessive sweating	0.894	0.133	-0.355	0.143	1.280	0.214
7	Palpitations	1.493	0.180	-0.114	0.097	1.140	0.140
8	Headache	0.988	0.139	-1.398	0.209	0.383	0.133
9	A bloated feeling in the abdomen	1.245	0.158	-0.114	0.108	1.264	0.165
10	Blurred vision or spots in front of eyes	1.268	0.159	-0.039	0.106	1.347	0.170
11	Shortness of breath	1.368	0.178	0.550	0.110	1.695	0.196
12	Nausea or an upset stomach	1.251	0.157	-0.182	0.109	1.260	0.164
13	Pain in the abdomen or stomach area	1.077	0.148	0.118	0.117	1.558	0.212
14	Tingling in the fingers	1.347	0.181	0.712	0.120	1.742	0.207
15	Pressure of tight feeling in the chest	1.699	0.209	0.153	0.090	1.234	0.138
16	Pain in the chest	1.855	0.246	0.840	0.106	1.843	0.186

Notes: α is the discrimination parameter. ß 1en ß2 represent the location or difficulty parameters. SE is the standard error of the estimated parameter.

7

General discussion



The central aim of this thesis was to investigate recent changes in mental health care provided in Dutch general practices. A mental health care system reform was introduced in 2014 in the Netherlands. The main objective of the reform was to increase the sustainability and the efficiency of the mental health care system, by restricting the volume of specialized mental health care, and by strengthening mental health care in general practice. The reform was likely to have a considerable impact on general practice. Therefore, it was important to monitor changes in the mental health care provided in general practice in recent years. In the final chapter of this thesis, the findings are summarized and discussed. I draw general conclusions, and elaborate on implications for clinical practice and future research.

7.1 Main findings

In this paragraph, the principle findings from chapters 2 to 6 are summarized. The central question of this thesis was: 'To what extent has mental health care in general practice changed in recent years?'

Overall, in chapters 2 to 6 we have shown that, in recent years, the mental health care provided in general practice has changed in some aspects (namely volume of provided care and triage), and less in other aspects (namely task shifting and antidepressant prescriptions).

We formulated six research questions:

1. *What was the potential for substitution of mental health care towards general practices prior to the reform?*

The results of the study in chapter 2 showed that, prior to the reform, there was a potential for a shift of patients with mental health problems from mental health professionals towards general practice (substitution). In 2012, approximately one third of the patients treated by primary care psychologists (since the reform: generalistic basic mental health care), and one fifth of the patients treated in specialized care, did not have a diagnosed DSM-IV psychiatric disorder. Around half of the patients referred by GPs to mental health professionals did not (yet) have a diagnosis of a psychiatric disorder. According to a new referral model, introduced along with the reform of the mental health care system in 2014, all patients without a

psychiatric disorder should no longer be referred by GPs to generalistic basic mental health care or specialized care, and should be treated within general practice instead.

2. *Has the volume of mental health care in general practice increased in the period 2010-2014?*

The number of general practices employing a mental health nurse increased from 20% in 2010 to 83% in 2014 (chapter 3). GPs (OR=1.23; 95%CI=1.17-1.28) as well as mental health nurses (OR=2.03; 95%CI=1.70-2.43) treated increasing numbers of patients with psychological or social problems between 2010 and 2014. Yearly, GPs had on average two consultations per patient with mental health problems, mostly short consultations. Mental health nurses had on average three consultations per patient per year, mainly long consultations. The mean number of consultations per patient slightly increased over the years, for both GPs and mental health nurses.

3. *To what extent did mental health nurses take over mental health care previously managed by GPs?*

Mental health nurses did not take over care from GPs in the period 2010-2014, but provided additional consultations to patients with mental health problems (chapter 3). GPs employing a mental health nurse treated slightly more patients with mental health problems than GPs without a mental health nurse. GPs with a mental health nurse did not have fewer or shorter consultations per patient with mental health problems than GPs without a mental health nurse. Compared to patients who visited the GP for mental health problems, mental health nurses mainly treated females, adults, and patients with common psychological or social problems, such as depressive or anxious feelings, neurasthenia, stress, or relational problems.

4. *Has antidepressant treatment in general practice decreased in the period 2011-2015?*

The results of the study in chapter 4 show that antidepressants were still commonly prescribed in general practice in the period 2011-2015. GPs prescribed antidepressants to patients in 30% of anxiety or depression episodes, and about half of them were prescribed in the first week after diagnosis (which is not in line with the recommendations from evidence-based guidelines, especially not for patients with only mild symptoms). The

number of antidepressant prescriptions slightly increased in the period 2011-2015. The number of immediate antidepressant prescriptions (within the first week after diagnosis) was lower in 2015 compared to 2011. Antidepressants were more frequently prescribed for anxiety or depressive disorders than for anxious or depressive symptoms.

5. *To what extent has the possibility of mental health nurse treatment influenced antidepressant prescriptions in general practice?*

So far, the introduction of mental health nurses has not resulted in a decrease in the number of antidepressant prescriptions in general practice, but it may have had a postponing effect, i.e. that antidepressants were less frequently prescribed in the first week after establishing the diagnosis (chapter 4). The employment of a mental health nurse was not associated with a decrease in total or immediate antidepressant prescriptions. Patients who had at least one consultation with a mental health nurse had fewer immediate prescriptions of antidepressants, but as many antidepressant prescriptions in total, compared to patients who did not consult a mental health nurse.

6. *Is it feasible for GPs to allocate patients with mental health problems to treatment according to the new referral model, and can a more efficient 4DSQ play a role in this?*

In 2014, GPs working in a large, well-equipped primary health care center made decisions on treatment allocation that were in line with the new referral model for 87% of patients (chapter 5). Approximately 42% of the patients with mental health problems were allocated exactly according to the new referral model. Another 45% were allocated to a setting that was less specialized than was allowed by the referral model. The participating GPs were inclined to treat many patients with psychological problems within general practice, approximately three quarter of them. Only 13% of all patients were allocated to a more specialized setting than was indicated by the referral model.

In general, patients showed an improvement in their symptoms after three months, regardless of whether the treatment allocation was in line with the referral model or not. These results indicate that GPs' clinical evaluations were of good quality, allocating patients to the right treatment

setting, but it can also be interpreted that patients' symptoms improve regardless of treatment setting.
In chapter 6, it was shown that the efficiency of the Four-Dimensional Symptom Questionnaire, often used to assess mental health problems and to distinguish between normal 'distress' and psychopathology in general practice, could be improved by applying a dynamic computerized method (computerized adaptive testing or CAT). This method selects the most informative items for each individual patient, based on previous responses. The total number of items on the 4DSQ could be reduced by 56% on average (from 50 to 22 items), without losing a considerable amount of measurement precision.

7.2 Discussion of findings

In this paragraph, our findings are discussed, together with the existing literature, structured in five general themes:

- The increased volume of mental health care provided in general practice
- Mental health nurses
- Triage and psychological diagnostic assessment in general practice
- Challenges for general practices since the reform of the mental health care system
- The international relevance of this thesis

7.2.1 The increased volume of mental health care provided in general practices

Our study showed that prior to the reform there was a considerable potential for substitution, and indeed, in recent years, increasing numbers of patients received mental health care in Dutch general practices, from either the GP or a mental health nurse. GPs themselves reported an increase in the number of patients visiting their practice for mental health problems, and experienced a higher workload as a consequence [1]. Since this was an observational study, it is not clear whether the increased volume in GP mental health care is (partially) a result of substitution from specialized mental health care towards general practice, which was an envisioned goal

of the reform. Various other factors may explain the recently increased volume of mental health care provided in general practice.

Firstly, some people think that the challenges of modern society, such as the increasing presence of technology in our daily lives, may cause higher prevalence rates of mental health problems. For example, social media use is associated with depression amongst youth [2]. On the other hand, prevalence rates of mental disorders seem to have remained quite stable in the general population during recent decades [3,4]. Changes in the perception of mental health problems may also be an underlying reason for the increase in the number of patients visiting the GP for mental health problems. Variations in normal daily life emotions, such as bereavement or stress, are becoming increasingly frequently experienced and/or labeled as psychological suffering [5,6].

Secondly, patients might also be more likely to seek professional help for mental health problems than in the past. Nowadays, culture is becoming more and more focused on the medicalization of problems of everyday living, psychology, and therapy [7]. In recent years, the Dutch Ministry of Health, Welfare and Sports has explicitly propagated information to diminish the stigma associated with depression treatment. Illustrative was a national media campaign on depression, which was launched in 2016. The self-help website that was promoted through the campaign was visited by around 45,000 people during just the first few months [8]. In the last years, it may have become more obvious or accepted to seek professional help for the treatment of psychological or social problems.

Thirdly, the increase in patients visiting general practice with mental health problems may be partly explained by an increased recognition and/or recording of mental health problems by GPs. A tailored training program for GPs increased their recognition of anxiety and depression, so there seems to be room for improvement [9]. Our study showed that GPs who employed a mental health nurse treated a slightly higher number of patients with mental health problems. This could mean that the introduction of mental health nurses in general practices improved the recognition of mental health problems by GPs. However, the difference between GPs with and without mental health nurse was only small, and many GPs themselves still report a lack of mental health expertise [1], even after years of collaboration with a mental health nurse. It may also be that GPs with more mental health experience or affinity were more likely to employ a mental health nurse.

Fourthly, the observed increased volume in mental health care provided in general practice may be a result of substitution of mental health care from specialized care towards general practice. This seems a plausible explanation, which is supported by the considerable potential for substitution that we observed prior to the reform. In the period 2012-2014, the number of patients treated in specialized mental health care decreased slightly, while the number of patients treated in generalistic basic mental health care showed no clear increasing or decreasing trend [10,11]. However, the increased volume in mental health care in general practice was already observed from 2010 onwards, while the major reform and the new referral model were introduced in 2014. We also observed an increase in provided mental health care across a wide range of GP patients, with both psychological symptoms and disorders, while the new referral model only restricts the referral of patients without a psychiatric disorder. This makes it more plausible that the observed increased volume of mental health care in general practice is, besides being linked to substitution, at least partly attributable to other factors, such as those mentioned earlier. Reduced capacity in specialized mental health care could also have resulted in waiting lists, which were indeed reported by many GPs in 2016 [1,12]. This means that patients who could not immediately be treated in specialized mental health care were likely to (temporarily) receive treatment within general practice, which increases the volume of provided care in this setting. This seems an undesirable form of (only temporary) substitution, since patients do not immediately receive the essential medical services they need, and it places a burden on GP care. It is also possible that in recent years more patients with (chronic) mental health problems returned to general practice after diagnostic assessment in specialized care, or after their treatment in specialized care has ended. However, we think that this has only have occurred on a small scale, since no explicit policy measures were taken to promote this shift.

Fifthly, the increased volume may be attributed to the introduction of mental health nurses. The increase in the volume of provided mental health care in general practice seems to have co-occurred alongside the increase in the number of working hours of mental health nurses since 2008. Our study showed that GPs without a mental health nurse do not treat *more* patients over the years themselves than GPs with a mental health nurse. This implies that mental health nurses provide extra or additional care to patients with

mental health problems that would not have been provided by GPs themselves if mental health nurses had not been present. The concept of supply-induced demand might be applicable to mental health nurse treatment. Supply-induced demand means that the use of health services is as large as the supply: 'a bed built is a bed filled' (Roemer's Law of Demand [13]; also see paragraph 7.2.2).

The increased volume of mental health care provided in Dutch general practices may have several positive effects. It is likely to reduce undertreatment of common mental health problems in the general population, and it may prevent persons with mild symptoms from developing more severe problems. Providing treatment to patients who do not yet meet the criteria of a psychiatric disorder might prevent them from developing it later on [14, 15]. Moreover, primary care is less expensive than specialized care, with at the same time fewer stigmas and less risk for medicalization. However, it is not yet clear whether the increased volume in mental health care in general practice is mainly a result of substitution. The increase in mental health care provided in general practice may put a burden on the workload in general practice, while it poses several other challenges, which are discussed in paragraph 7.2.4.

7.2.2 Mental health nurses

Our study showed that mental health nurses mainly treat patient with common psychological or social problems. This is in line with a previous study involving fifteen mental health nurses [16], which showed that they often treated patients with stress, 'burn out', depressive feelings, bereavement, anxiety, or work problems. Mental health nurse patients mainly have a need for 'listening and support', and less often for practical advice [17]. Mental health nurses mainly use psycho-education and cognitive behavioral therapy techniques during treatment [16]. In general, patients seem satisfied with the care provided by mental health nurses [16,18,19], although the role of the mental health nurse was not always clear in advance [18]. Other research showed that patients were not always satisfied with mental health care provided in general practice [20], mainly because of too little mental health expertise amongst GPs and mental health nurses, too little support to discontinue antidepressant use, not enough attention paid to the social context of the patient, and too little support in

case of waiting lists for treatment in generalistic basic or specialized mental health care.

So far, few studies have investigated the (cost-)effectiveness of mental health nurse treatment in the Netherlands. In general, studies evaluating psychological interventions provided in the primary care setting show that they have modest effects on clinical outcomes [21-26]. Collaborative stepped care, including the involvement of mental health nurses, improved patients' anxiety symptoms more than 'care as usual' in general practice [27]. Australian studies evaluating mental health nurse treatment showed that it seemed to improve patients' functioning, but no control group was included in the study to compare outcomes [28,29]. It seems of crucial importance that mental health nurse treatment is effective, since substitution of care is only successful if it prevents referrals, and not if it simply delays them [30]. Therefore, future research is needed (see paragraph 7.6).

Our study showed that the majority of Dutch GPs employed a mental health nurse in 2014. In general, GPs are satisfied with the collaboration with the mental health nurse [19,31]. In the period 2010-2014, mental health nurses treated increasing numbers of patients. As a result, like GPs, mental health nurses may experience a high workload. Waiting lists for mental health nurse treatment seem to have risen in about half of general practices [1,12]. This puts a burden on the accessibility of care. The workload of mental health nurses is expected to increase further, because they are expected to play an important role in the collaboration with recently developed social teams in municipalities. The working hours of mental health nurses have been steadily increased since their introduction. This raises the question of whether the capacity of the mental health nurse should be increased even further in the coming years. About half of GPs think that the working hours of the mental health nurse should increase further, while the other half has the opinion that the current number of working hours is sufficient [1]. However, a limit must be set somewhere. If the concept of supply-induced demand is applicable to mental health nurse care, the demand could be (almost) never-ending. A solution for the increasing workload of mental health nurses may be found in an adequate selection of patients for mental health nurse treatment. The GP decides which patients visit the mental health nurse after a first consultation. Therefore, it seems essential for GPs to be able to distinguish between patients who would benefit the most from mental health nurse treatment (or who are genuinely

in need of further diagnostic assessment), patients who will recover without any further treatment, and patients who should be referred (also see paragraph 7.5 and paragraph 7.6).

Our study showed that Dutch mental health nurses, so far, do not seem to influence the mental health care provided by general practitioners themselves, at least neither in taking over patients or consultations from the GP, nor in decreasing their antidepressant prescriptions. Previous research on the spin-off effects of mental health professionals in general practice showed mixed results. A Cochrane review showed that the integration of mental health professionals in general practice, such as mental health nurses, may have beneficial spin-off effects, such as a decrease in the number of GP consultations, prescriptions of psychotropic drugs, and referrals [32]. That we did not find such spin-off effects may be caused by the fact that is it difficult to compare our study on mental health nurses to other initiatives, with varying content, and in various other countries. A Dutch study evaluating a stepped collaborative care program, including the integration of mental health nurses in general practices in 2008, concluded that it decreased GPs' prescriptions of antidepressants, but only for anxiety (not for depression), and also that it led to higher – instead of lower – numbers of GP consultations and referrals for anxiety and depression, in contrast to the conclusions of a Cochrane review [33,34]. That this program did influence GPs' antidepressant prescriptions might be explained by the fact that this program was far more extensive than solely the employment of mental health nurses, as in this thesis. That we did not find any spin-off effects of the integration of mental health nurses in general practices may also be attributed to the fact that we investigated them shortly after the introduction of mental health nurses. The full impact of mental health nurses may only become apparent after a longer period of time (see paragraph 7.6).

The mental health nurse seems the right person to facilitate the use of e-mental health in general practice. Stimulating e-mental health use was one of the measures aimed at strengthening mental health care in general practice. Since the reform, most mental health nurses reported that they have used e-mental health, mostly in addition to their face-to-face consultations, 'blended care' [35,36]. According to the mental health nurses, e-mental health improves the quality of their treatment. However, they also reported that they have only used it for a small group of patients (10%), and patients often did not complete the e-mental health program [35]. E-mental

health seems to be an area for improvement, especially since it could ultimately offer possibilities to decrease the workload in general practice (see paragraph 7.5).

7.2.3 Triage and psychological diagnostic assessment in general practices

According to the new referral model introduced in 2014, all patients with psychological problems but without a psychiatric disorder should no longer be referred by GPs to generalistic basic mental health care or specialized care, and should be treated within general practice instead. Our study showed that GPs working in a large, well-equipped primary health care center in 2014 made decisions on treatment allocation that were mostly in line with the new referral model. The participating GPs were inclined to treat many patients with psychological problems within general practice, approximately three quarters of them. However, the study was performed in just one - well equipped - primary health care center, and we do not know whether GPs working in other general practices, especially those without a mental health nurse, are able to implement the new referral model to the same extent (see paragraph 7.6).

GPs have a gatekeeper function and make important decisions on triage and treatment allocation. Therefore, good quality psychological diagnostic assessment in general practice is of high importance. It is likely that the employment of mental health nurses has already improved the quality of psychological diagnostic assessment in general practice. However, since more and more patients are visiting general practice with mental health problems, putting a burden on the workload of both GPs and mental health nurses, there is an urgent need for efficient screening instruments. Many GPs may find the screening instruments that are presently available inadequate or not useful [37,38], and they may therefore not use them often. Since GPs mainly want to use screening instruments in addition to their own clinical evaluation, it seems of even higher importance that the available screening instruments are short and efficient.

Our study showed that the efficiency of the 4DSQ, a questionnaire that can be used to distinguish between 'normal' distress and psychopathology, may be improved by applying computerized adaptive testing (CAT). However, some obstacles exist for the successful implementation of a CAT version of the 4DSQ (or another digital screening instrument) in general practice. First, current information and

communication technology (ICT) capabilities in general practices are insufficient for the implementation of CAT, which requires sophisticated statistical software. Second, it is not clear to what extent GPs are willing to implement a CAT version of the 4DSQ. GPs may use responses from individual 4DSQ items for a quick clinical evaluation or as an agenda setting tool, and these functions may be lost when applying CAT. Lastly, it is not clear if CAT is appropriate for all patients. Some patients may prefer a paper-and-pencil version of a questionnaire to an online assessment.

Although a CAT version of the 4DSQ might not be immediately available for use in clinical practice, some studies have already shown that CAT versions of traditional questionnaires can be used in a clinical setting [39-41], and are well accepted by patients [40]. Recently developed, free-to-use online CAT platforms [42,43] are likely to enable the development of new CAT questionnaires, so application of a CAT version of the 4DSQ in clinical practice may be within reach.

7.2.4 Challenges for general practices posed by the substitution of mental health care

Besides facing a higher workload as a result of an increased volume of mental health care, there may be several other challenges for the professionals working in general practices since the reform of the Dutch mental health care system. The recent developments in general practice as observed and described in this thesis seem to be in line with the aims of the reform, namely substitution of mental health care and strengthening of mental health care in general practice. But while substitution of somatic care seems quite straightforward, substitution of mental health care may pose extra challenges to the professionals working in general practice, for example because the borders of mental health problems and treatment are not as clear as those in somatic care.

Specialized care in a generalist setting?

The integration of mental health nurses in general practices might have blurred the border between primary and specialized mental health care. Many mental health nurses have quite a specialized background, often as a psychiatric nurse or psychologist. Depending on their years of experience and training, they may have more mental health expertise than the GP, who is supposed to be the supervisor and responsible for the content of the care

provided in general practice. Mental health nurses trained as a psychologist might be tempted to treat patients with psychological problems, even those with complex problems, within general practice, because they have the required expertise. Moreover, for patients, including those with more severe problems, who ideally co-decide with the GP on further treatment, mental health nurse treatment in general practice is attractive (free, without stigma, in a familiar setting, and close to home). As a consequence, the mental health care provided in general practice may sometimes be more specialized than previously provided by the GP. It is not clear whether this is in line with the point of view of GPs' professional organizations [44]. To decrease the risk of providing mental health care that is too specialized in a generalist practice setting, GPs should be better trained in mental health, while mental health nurses should restrict themselves to providing care to patients without overly complex problems (see paragraph 7.5).

Thinking in DSM diagnoses in general practice?

There is an apparent discrepancy between the new referral model, focused on DSM-IV [45] diagnoses, and the symptom-focused approach in general practice. The new referral model requires a (suspicion of a) psychiatric disorder for referral, which may put pressure on the clinicians working in general practice to think in terms of DSM diagnoses, and, even more undesirably, to establish them too easily. Mental health nurses are often accustomed to the use of the DSM, while more and more experts think that mental health professionals should focus on the severity of dysfunction or suffering, and not on diagnoses [46,47]. Traditionally, GPs use the International Classification of Primary Care (ICPC) for the classification of diseases (although GP guidelines for anxiety and depression also have a basis in the DSM criteria), and they are used to working with general symptoms. Mental health care in general practice might be more effective without a formal diagnosis, with less stigma, and with more room for the patient having an active role. The introduction of a new edition of the DSM, the DSM-5 [48], in 2013, can be expected to further stimulate "diagnostic inflation" and for example prescriptions of antidepressants, by liberalizing criteria and thereby broadening psychological diagnoses [49,50]. The new referral model, the integration of mental health nurses in general practices, and the revised version of the DSM may eventually affect how mental health problems are perceived by the professionals working in general practice.

Mental health nurses as well as GPs might be increasingly disposed to label patients with psychological diagnoses. They should be careful and reserved with establishing (DSM) diagnoses.

Preventing medicalization or stimulating it?

Treatment in general practice decreases risk on medicalization for some patients with psychological problems, because they can receive psychological treatment in a general practice setting, instead of in a specialized care setting. At the same time, there is a risk of overtreatment and medicalization of the 'normal' problems of everyday living. Mental health care provided in general practice is covered by the basic insurance, so is free for all Dutch citizens, with less stigma, and is overall accessible. This is, of course, a strong feature of general practices, but it could also have a downside. Since many mental health problems of patients will also enter remission without treatment [51], the question arises over whether all patients who seek professional help in general practice should receive treatment, especially since the main reasons for the reform were cost-related. Since resources are scarce, treatment of the "inevitable variation and lapses in human behavior" should be avoided [52]. Since the demand for mental health care in general practice is apparently increasing and the workload was already high, it seems even more important to make the right decisions on who and who not to treat. Therefore, more research is needed on the patients who genuinely need treatment by mental health nurses in general practice and who could benefit most (see paragraph 7.6). Training of GPs should provide them with the knowledge on which patients they should transfer to the mental health nurse, and which patients are likely to recover without further treatment (paragraph 7.5).

7.2.5 International relevance of this thesis

This thesis has a national, Dutch orientation. Worldwide, however, numerous initiatives have been undertaken to promote substitution of mental health care, and to improve the accessibility and quality of primary mental health care, including training of GPs, enabling consultation-liaisons (the possibility for primary care physicians to consult mental health specialists), and developing collaborative care (usually by adding mental health professionals, such as care managers or nurses, to the primary care staff). The WHO explicitly states that it is important to redirect funding

towards community-based mental health services, including the integration of mental health care into the general health care setting [53].

Potential for substitution of mental health care is likely to exist in other countries, as is shown by the numbers of patients without a psychiatric disorder treated in specialized mental health care [54,55], and by numerous international studies evaluating the strengthening of primary mental health care [22,28,29,32,56-62]. Various (national) factors influence the role of GPs in the mental health care system [63,64], for example the referral system, GPs' workload, GPs' mental health expertise, financial regulations, and patient expectations. These factors vary greatly between countries, and they influence the potential for substitution of mental health care from specialized care towards general practice.

The findings of this study are most relevant for countries in which the GP has a gatekeeper function and a certain level of mental health expertise, and where sufficient possibilities exist to provide mental health care in general practice. GPs working in the UK [65], Canada [66], and Australia [29] are collaborating with professionals similar to mental health nurses. This may enable substitution of mental health care towards general practice in these countries. Moreover, workload in general practices in other countries is often lower than the workload in Dutch general practices [67], which might also contribute to successful substitution. According to an international comparison of high-income countries, including the UK, Australia, and the US, Dutch primary care physicians have the best abilities to diagnose depression [68], although large variations may exist between physicians within countries. However, even Dutch GPs report a lack of mental health expertise [1]. This seems to imply that, for substitution of mental health care to be successful in other countries, providing training to GPs in the field of mental health is even more important than in the Netherlands.

An important finding from this study is that mental health care can apparently be provided in Dutch general practices to a large number of patients with mental health problems. However, although the function of the mental health nurse has been introduced on a very large (national) scale, its full effects are not yet clear. For example, it is not clear how effective mental health nurse treatment is, or whether it prevents patients from needing specialized care. It is also possible that as more and more patients with mental health problems are detected by GPs and mental health nurses,

more will be treated by mental health care professionals in the long term. This makes carefully monitoring the number of patients treated across the entire mental health care system of high importance. Ultimately, future research should learn if the reform will reach the envisioned goals, such as substitution of mental health care. If comparable major changes in the mental health care system are implemented in other countries, monitoring the consequences should also be of high importance.

7.3 Methodological reflections

In this paragraph, the strengths and limitations of the research methods used in this thesis are discussed. Firstly, we discuss the databases with medical records that were used for the studies in chapters 2 to 4. Next, we discuss the case study in a primary health care center that was used for the studies in chapters 5 and 6.

7.3.1 Databases with medical records

In chapter 2, we combined routinely recorded data from two national databases, covering both primary care (the NIVEL Primary Care Database, NIVEL-PCD) and specialized care, to describe the care provided in the mental health care system prior to the reform in 2012. In chapters 3 and 4, we used data from the NIVEL-PCD to explore trends in consultations and antidepressant prescriptions in general practice in the period 2010-2014 and 2011-2015.

A major strength of the use of routinely recorded medical data is that they enabled us to describe provided clinical care for a very large sample of patients, during multiple years, on a national level. Since the data were observational, we cannot conclude on causal effects, however, routinely recorded data in general practices enabled us to compare provided care in general practices before and after the employment of mental health nurses, as in a natural experiment.

When using medical record data, it is important that the used sample is representative of the general population. The patient populations of the general practices participating in the NIVEL-PCD are representative of the Dutch population according to sex and age. On the level of practices, group practices were modestly over-represented. Since group practices have more

resources to employ a mental health nurse compared to solo GP practices, this could mean that our data are based on an overestimation of practices with a mental health nurse. On the other hand, practices in urban locations, which collaborate more often with a mental health nurse, were under-represented. The percentage of practices employing a mental health nurse in 2015 was comparable to the number from a national GP survey [69].

In 2012, 543 primary care psychologists were participating in the NIVEL-PCD, providing care to 45,947 patients. The database covered 15% of all patients treated by primary care psychologists working in the Netherlands [70].

Data on specialized care were extracted from a national database for specialized care. This database covers all mental health professionals, mostly psychiatrists and psychologists, working in Dutch specialized mental health care institutions, as well as solo operating entrepreneurs. Professionals working in specialized care are obliged by Dutch law to record all provided care that is paid for by health insurers in the national database. Therefore, virtually all Dutch patients treated in specialized mental health care were represented in this database.

A limitation of our study is that the results of chapters 3 and 4 are probably an underestimation of the numbers of consultations for mental health problems and antidepressant prescriptions in general practice. When mental health problems appear together with a chronic illness or vague somatic symptoms, as they often do, GPs sometimes record a somatic diagnosis of symptom instead of a mental health problem during a consultation. Previous research has shown that GPs do not always recognize psychological problems, or that they may be aware of mental health problems but do not label patients with a specific psychological diagnosis [71]. Antidepressant prescriptions were probably also underestimated, for two reasons. Firstly, patients who had been using antidepressants since 2010 or before, and who did not have a new episode of anxiety or depression during the study period (2011-2015), were not included. Secondly, we could not include all repeat prescriptions of antidepressants provided through pharmacies. Sometimes, patients receive antidepressants directly from pharmacies, but only after their first prescription is provided by the GP. We were mainly interested in trends over time and the association between consultations or antidepressant prescriptions and mental health nurse employment. We have no reason to assume that the underestimation of

consultations and antidepressant prescriptions has influenced these outcomes.

A second limitation of using routinely recorded data is the dependency on their quality. However, since professionals working in general practice and in specialized care only get paid by health insurers if they record the care they provide, a certain level of quality in terms of completeness is ensured. Moreover, most general practices that participated in NIVEL-PCD did so for several years, GPs are trained in recording and coding according to national guidelines, and only data from general practices with the most complete records were used for our analyses.

Another limitation of the use of medical records is that we were, content-wise, dependent on what was routinely recorded. For example, professionals working in different settings use different classification systems. GPs use the ICPC, while the DSM-IV [45] (or more recently the DSM-5 [48]) is used in generalistic basic mental health care and in specialized mental health care. This may have complicated comparability between the different settings of the mental health care system in the study described in chapter 2. Moreover, we were not able to, besides DSM-V axis 2 to axis 4 comorbidity, include any other complicating factors in the studies in chapters 2 to 4, such as suicide risk. Risk of (self-) harm and course of the symptoms are included in the new referral model and are thereby relevant for this thesis, but they were not routinely recorded by professionals in any setting. However, they were included in the case study described in chapter 5 (see paragraph 7.3.2).

The content of the medical records enabled us to determine the employment start date of the mental health nurse, by identifying their first recorded consultation. However, this forced us to use a cut-off point in time to indicate the start of the mental health nurse's employment. In reality, the integration of mental health nurses in practices probably evolves gradually over time. This may (to some extent) explain why we did not find any clear associations between antidepressant prescriptions and the employment of mental health nurses in chapter 4.

Lastly, an important limitation is that, unfortunately, the referral records of many GPs were not complete. The consequences of the new referral model for GPs' referrals could therefore not be investigated on a national scale (see paragraph 7.6).

7.3.2 Case study

In chapters 5 and 6, we used data from a case study in 2014 in a large primary health care center in the northern part of the Netherlands. Patients with mental health problems visiting a GP completed a paper-and-pencil version of the 4DSQ. Additionally, GPs assessed the risk, complexity, and course of the symptoms of the patient. Patients were allocated to treatment, and after three months, the 4DSQ was filled in again. The case study was used to assess how often GPs' decisions on treatment allocation were in line with the new referral model (chapter 5). The 4DSQ data were also used to explore whether the efficiency of the 4DSQ could be improved (chapter 6).

A major strength of the case study is that we were able to carefully monitor the feasibility of the new referral model in a large, well-equipped primary health care center. The observational nature of the study enabled us to explore GPs' decisions on treatment allocation in clinical practice. Mental health problems were assessed using the 4DSQ, which is a widely used and validated instrument to assess a broad range of psychological problems in primary care [72]. The 4DSQ can be used to distinguish between 'normal' distress and psychopathology [73-75].

However, several limitations of the case study have to be considered. Firstly, our study was limited to one large primary health care center in the Netherlands that was well prepared to provide mental health care. The GPs participating in the study were probably more interested in, or had more experience with, mental health problems than other GPs. The feasibility of the referral model may be very different in other general practices, for example in particular when they did not employ a mental health nurse (see paragraph 7.6).

Secondly, patients were not randomly assigned to different treatment conditions as in a trial, but were able to co-decide with their GP on further treatment. Patients may have had varying reasons to prefer treatment in a certain setting, for example in general practice, because of accessibility or financial benefits. Some other variables may have influenced treatment allocation, such as the severity of the psychological problems or (a lack of) motivation for treatment. These variables can also influence the improvement of a patient's symptoms. We were only able to adjust analyses for some sources of bias, namely severity of symptoms at baseline, and the age and gender of the patients. Therefore, our conclusions on improvement

of symptoms after three months are only applicable to patients who are allocated by their GP to treatment in a naturalistic way.

A third limitation is that we did not know for all patients the start date and duration of the treatment that they were allocated to, especially if they were referred for treatment outside the general practice. It usually takes some time following referral to begin with treatment in mental health care. This is why the conclusions on the improvement of symptoms after three months should be interpreted carefully. Some patients may have changed to a different treatment setting, but this is likely to have occurred after our follow up measurement.

A fourth limitation was that the GP assessment at baseline was not complete for a relatively high number of patients. We assume that the GPs sometimes decided not to complete the assessment form if the problems of the patient were not severe; for example, to save time. Patients with missing scores were indeed mainly allocated to no treatment or to treatment in general practice, which is an indication for non-severe problems. We decided to base the policy recommended treatment allocation of these patients on just the 4DSQ. Only a third of all patients completed the follow-up measurement. However, these patients did not differ from the patients who completed the follow up measurement regarding age, gender, and symptoms.

Fifthly, we tried to capture policy recommended treatment allocation with an algorithm using the baseline assessment scores. Our interpretation of the policy recommendations might have influenced the results of the study. Therefore, we performed sensitivity analyses with a more liberal interpretation of the policy recommendations, forcing the recommended treatment allocations to be more in line with the actual treatment allocations. The results of the sensitivity analyses were in line with the original analyses.

In chapter 6, we used the data from the case study to explore whether the efficiency of the 4DSQ could be improved in a simulation study. The simulation study had its own limitations. We used responses to a paper-and-pencil version of the 4DSQ. In reality, responders might respond differently when receiving a computerized adaptive assessment. For example, we do not know if the actual computer administration might influence responses or what effect differences in the item order may have. However, a previous study showed that differences between results from a simulation CAT and a real CAT were small [76]. We used data from the case study in a northern

region of the Netherlands, but parameter estimates based on data from different regions and countries might also differ. Regarding the psychometric evaluation, our data showed some weaknesses. This might be solved in future studies by leaving out some of the items, or by making them dichotomous. This simulation study is only the first step needed for the development of a CAT version of the 4DSQ. In further research, it should be followed by a study on a real time CAT and eventually by an evaluation of the developed CAT version in a clinical setting.

7.4 Conclusions

Overall, we have seen in this thesis that, recently, mental health care provided in Dutch general practices has considerably changed in some aspects (namely volume of provided care and triage), but less in other aspects (namely task shifting and antidepressant prescriptions).

In recent years, the volume of mental health care provided in general practice has steadily increased. The increased volume is likely to be the result of an increased (perceived) prevalence of mental health problems in the general population, more help-seeking behavior, and perhaps also better recognition or recording of mental health problems by GPs. It is probably also a result of substitution of mental health care from specialized care towards general practices. We observed a considerable potential for substitution prior to the reform, and a new referral model restricting the number of patients that could be referred by GPs could be implemented well in a large primary health care center. The integration of mental health nurses has not (yet) decreased GPs' workload by taking over patients or consultations, nor has it decreased GPs' antidepressant prescriptions.

The increased volume of mental health care provided in Dutch general practices may have several positive effects. It is likely to reduce undertreatment of common mental health problems in the general population, and it may prevent persons with mild symptoms from developing more severe problems. Moreover, primary care is more affordable than specialized care, with at the same time fewer stigmas and less risk for medicalization. However, the increased volume of mental health care provided in general practice might also have some unintended effects, such as a risk for medicalization of 'normal' problems of everyday living,

since the general practice provides accessible care, without any financial barriers, and mental health nurses have the expertise to treat many patients.

The demand for mental health care in general practice is likely to expand further in the coming years. Since the workload in general practice was already high, it is becoming increasingly important to distinguish between patients who genuinely need (mental health nurse) treatment, and patients with 'normal' distress or emotions, who often recover naturally without further treatment.

7.5 Implications for clinical practice

This thesis has the following implications for clinical practice:

- It seems important to provide (extra) training in the field of mental health to GPs, especially concerning diagnostic assessment. Since the volume of mental health care in general practice has increased in recent years, and is expected to expand further in the near future, it is important that GPs are well prepared to provide mental health care to their patients. Better trained GPs supposedly have better skills to recognize mental health problems, but they should also be better able to adequately distinguish between patients who are genuinely in need of further treatment (provided either by themselves, by the mental health nurse, in generalistic basic mental health care, or in specialized care), and patients who will recover without any further treatment. This distinction is important, since the demand for mental health care in general practice otherwise will place a too large a burden on GPs' and mental health nurses' workload. A situation in which too many of the patients who visit the GP with psychological symptoms receive mental health nurse treatment should be prevented, since overtreatment is undesirable, and the supply would supposedly never meet the demand. Furthermore, training of GPs could prevent the difference in mental health expertise between the GP and the mental health nurse from being too large. This difference might increase in the future, if mental health nurses take over mental health care from GPs. A large difference in mental health expertise between GPs and mental health

nurses should be prevented, since the latter formally work under the supervision of the GP.

- Special attention is needed for the high workload in general practice. Substitution of mental health care is likely to considerably increase the workload in general practice. Many other developments in the health care system, including the substitution of somatic care, and an increasing amount of administrative tasks, were also already increasing the workload in general practice. New initiatives should be developed to decrease the workload of general practitioners, for example experiments with a smaller number of registered patients per practice.
- The workload of mental health nurses should also be evaluated. Their working hours have been increased over the last few years, but there must be a limit somewhere. It seems undesirable that mental health nurses work (many) more hours than GPs, since they formally work under their supervision. GPs and mental health nurses could discuss which patients are genuinely in need of treatment by the mental health nurse, and which patients could benefit the most from it, for example by evaluating previous patients. They could also experiment with (small) thresholds for mental health nurse treatment, such as a short period of time (for example one of two week) of consideration for patients, instead of directly arranging a follow up appointment with the mental health nurse after GP consultation. In this natural way, patients have the opportunity to improve themselves, and patients who will recover naturally are separated from patients who are genuinely in need of mental health nurse treatment.
- E-mental health could be used more often, both by GPs and by mental health nurses. Mental health nurses mainly use e-mental health in addition to face-to-face consultations, but one of two consultations might be replaced by e-mental health [36], which could reduce the workload of mental health nurses. For some patients, e-mental health could be provided instead of mental health nurse treatment. A requirement for this is that GPs are familiar with the currently available e-mental health services; an overview can be found online [77].

- More measures should be taken to decrease the number of antidepressant prescriptions in general practice, since they are often not in line with guideline recommendations (for example being provided too quickly or to patients with only mild symptoms). The introduction of mental health nurses does not seem to have had a positive spin-off effect on decreasing the number of antidepressant prescriptions so far, besides a short term delaying effect. Other, more intensive, initiatives could sort more effects in decreasing antidepressant prescriptions by GPs (for example training GPs in guidelines and stepped care [78]). In a new version of the Dutch GP guidelines for depression, currently being revised, more emphasis will be placed on not starting treatment with antidepressants, side effects, and the discontinuing of antidepressant use [79]. In the near future, mental health nurses could play a role in supporting patients if they want to gradually discontinue their antidepressant medication.
- GPs as well as mental health nurses should be aware of the risk of providing overly specialist mental health care in a generalist practice setting, such as medicalization. Mental health nurses who have the expertise to provide specialized care should adopt a generalistic approach and restrict themselves to short-term treatment, for example by setting up treatment goals and plans in advance for every patient, by not exceeding the maximum number of consultations, and by referring patients with problems that are too complex. Treatment of mental health problems by a generalist requires a different attitude than treatment by a specialist. For example, a generalist's attitude is focused on normalizing the patient's problems. Generalists pay attention to the context and resilience of patients, instead of focusing on pathology [80]. Training GPs in mental health could, perhaps surprisingly, also guard the generalistic nature of general practice, since better trained GPs are supposedly better able to distinguish between mental health care that should be provided in general practice, and care that should be provided in a specialized setting.

7.6 Implications for research

Future research should involve the following topics:

- Volume of provided generalistic basic mental health care and specialized mental health care. It is plausible that the presence of mental health nurses in general practice influences the number of patients treated in other settings of the mental health care system. The increase in patients treated in general practice will possibly be accompanied by a decrease in patients in specialized care, as the early treatment of patients might prevent them from needing further treatment (substitution). On the other hand, it is also possible that as more and more patients with mental health problems are detected by GPs and mental health nurses, more will be treated by mental health care professionals in the long term. For example, a study evaluating an intensive stepped collaborative care program, including the integration of mental health nurses in general practices, concluded that it led to higher numbers of referrals for anxiety and depression [33, 34]. Patients who receive treatment by the mental health nurse might also become more motivated for further (specialist) treatment, when they otherwise may not have been motivated. Therefore, the volume of provided care in the mental health care system as a whole should be carefully monitored.
- Consequences of the reform of the mental health care system for general practices after a longer period of time. This thesis described the situation in general practice prior to and shortly after the reform. It is important that the care provided in general practice is continuously monitored, since the full impact of the reform and the introduction of mental health nurses is only likely to become apparent after a longer period. In particular, research on accessibility of mental health care in general practices has become quite urgent, since waiting lists seem to have risen for mental health nurses, and good accessibility is an important aspect of the care provided in general practice.
- Workload in general practice. The recent developments in the mental health care system are likely to considerably increase the workload in general practice, when it was already high. Research could further investigate GPs' as well as mental health nurses'

current workload, the consequences of a high workload, and explore new ways of restraining the rising workload, for example through pilots with smaller numbers of registered patients per general practice.

- Effectiveness and cost-effectiveness of mental health nurse treatment. Since mental health nurses have been introduced on a national scale and increasing numbers of patients receive mental health nurse treatment, it should become very clear what the costs and benefits of their involvement are, from both a societal perspective (such as economic benefits because of higher work productivity), and from a patient perspective (such as improved health and/or quality of life). Research could investigate whether mental health nurse treatment prevents patient from needing specialized mental health care in the longer term. Research could also demonstrate which patients are likely to benefit most from treatment by the mental health nurse, and which patients are likely to recover without any further treatment, so that GPs are better able to assess which patients in particular should be selected for transfer to the mental health nurse.
- GPs' referrals since the reform of the mental health care system. We were only able to explore the feasibility of the new referral model in one large, well-prepared primary care center. Unfortunately, the referral records of many GPs participating in 2014 in the NIVEL PCD were not complete and therefore could not be analyzed. The feasibility of the new referral model and the number of referrals since the reform should be evaluated in a larger study, including more practices and a larger variety of general practices.
- General practices without a mental health nurse. Some GPs, approximately 10-15%, have not (yet) employed a mental health nurse. Prior to the reform, the most commonly given reasons for GPs not employing a mental health nurse were a lack of space, or financial reasons [31]. Research should provide insights into their current reasons for not employing a mental health nurse, the consequences for the accessibility and quality of mental health care in these practices, and what might be needed for change.
- Mental health screening instruments and ways to improve their usefulness and efficiency. Screening instruments can be of high

importance for GPs, especially since the reform makes the distinction between psychological symptoms and psychiatric disorders a very important one. However, in clinical practice the use of screening instruments is not optimal. Research should investigate barriers and enablers for the implementation and use of mental health screening instruments in general practice. Our 4DSQ simulation study may be followed by a study on a real time CAT and eventually by an evaluation of the developed CAT version in a clinical setting.

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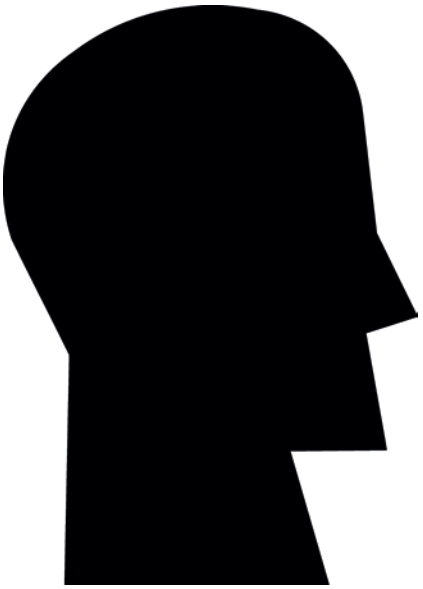
Summary



Summary

Background

In the Netherlands, general practitioners (GPs), as gatekeepers, have an important function in the mental health care system. Individuals who seek professional help for mental health problems initially visit the GP. The majority of people with mental health problems can be treated within general practice, by either 'watchful waiting', psychological therapy, or medication. GPs use guidelines for the management of patients with mental health problems. These evidence-based guidelines provide recommendations for diagnostic assessment and treatment, and are based on the stepped care principle. Stepped care means that each treatment starts with the least invasive intervention that is still expected to generate effects.

Although many patients with mental health problems can be treated within general practice, the number of patients treated in – expensive – specialized mental health care increased over recent decades. The costs of mental health care increased considerably, more than the costs of somatic care. This might be a consequence of GPs referring too many patients with relatively mild symptoms, 'just to be sure'. Too few patients may have returned to the general practice, even when they did not seem to have a psychiatric disorder after referral. As a result, too many patients with relatively mild symptoms, and without a psychiatric disorder, may have been receiving treatment in specialized care.

On January, 1st, 2014, a reform of the mental health care system was introduced by the Dutch government. The main objective of this reform was to increase the sustainability and efficiency of the mental health care system. An important aspect of the reform was the introduction of a new referral model for GPs. Since the reform, patients with a psychiatric disorder according to DSM criteria, but without complex problems or high risk, can be referred to generalistic basic mental health care. Besides, only patients with very severe or complex problems, a high risk of (self) harm, or recurrent problems should be referred to specialized care. All other patients should be treated within general practice.

The introduction of mental health nurses in 2008 was one of the most prominent measures to prepare Dutch GPs to treat more patients with mental health problems within general practice. Mental health nurses are often a psychiatric nurse or psychologist by training. Their main tasks are to

perform diagnostic assessments and to provide short-term care to patients with non-complex mental health problems in general practice. The consultation of specialists and the use of e-mental health were also stimulated to strengthen the mental health care provided in general practice.

The recent reform was expected to have a considerable impact on the mental health care provided in general practice. The reform was likely to stimulate a shift of the care for patients without complex problems from specialized mental health care towards primary care, especially general practice (substitution). As a result, the volume of mental health care provided in general practice was likely to expand. Moreover, the reform could have affected the content of the care provided within general practices. Mental health nurses may have taken over patients or consultations from GPs (task shifting). Also, the possibility of treatment by a mental health nurse may have decreased GPs' antidepressant prescriptions. GPs do not always follow the guideline recommendations while prescribing antidepressants, and antidepressant prescriptions are sometimes provided as a first step intervention, or to patients with only mild symptoms. The introduction of mental health nurses may have affected GPs' antidepressant prescription behavior. Lastly, the new referral model may have had a considerable impact on GPs' triaging of patients with mental health problems.

The goal of this thesis was to monitor the changes in the mental health care provided in Dutch general practices in the period 2010-2015, in the context of the reform of the Dutch mental health care system. The central research question was: 'To what extent has mental health care in general practice changed in recent years?'

We investigated the following aspects of mental health care in general practice:

- Volume of provided mental health care
- Task shifting from GPs to mental health nurses
- Antidepressant prescriptions
- Triage of patients with mental health problems

We expected a shift of the care for patients without a psychiatric disorder from specialized mental health care towards general practice (substitution) - and thus an increased volume of mental health care provided in general practice, task shifting from GPs to mental health nurses, a decrease in the number of prescriptions of antidepressants since the introduction of mental health nurses, and changes in the triage system after the introduction of the new referral model.

Methods

In this thesis, we used two different research methods: analyses using national databases with medical records of health care professionals, and a case study in a large primary health care center. We used two national databases to describe the care provided in primary care (GPs, and primary care psychologists, who are called generalistic basic mental health care since the reform) and in specialized care.

We analyzed medical record data from GPs who participated in the NIVEL Primary Care Database (NIVEL-PCD) in the period 2010-2015. The patients who are registered at these general practices are representative of the Dutch population. In total, the general practices represented over half a million patients in 2010, an over one and a half million patients in 2015. Only the data from the practices with the most complete records were used in the analyses.

GPs and mental health nurses record data on the consultations they provide (including home visits) to receive fees from health insurers, using CTG ('College Gezondheidszorg Tarieven') codes. For every consultation, a diagnosis is recorded based on the International Classification of Primary Care (ICPC). In this thesis, we only analyzed data on consultations regarding diagnoses from the P chapter (psychological problems) or Z chapter (social problems) of the ICPC. We distinguished between patients with a psychiatric disorder (codes P70-P99) and patients without a psychiatric disorder (P01-P29, psychological symptoms, and Z01-Z29, social problems). Based on the recorded consultations, we determined for each general practice if a mental health nurse was employed. GPs record prescriptions of medicines using the Anatomical Therapeutic Chemical Classification (ATC) system. We analyzed the prescriptions of all antidepressants (ATC-codes N06AA, N06AB, N06AF, N06AG, and N06AX).

In 2012, we could also analyze the referral records of a small number of practices (n=25).

We also analyzed the records of the primary care psychologists who participated in NIVEL-PCD in 2012. Like GPs, primary care psychologists, routinely recorded the care they provided to patients. In 2012, 534 primary care psychologists participated in NIVEL-PCD, providing care to 45,947 patients (15% of all patients treated by primary care psychologists in the Netherlands). A DSM-IV diagnosis was recorded for each patient. The DSM-IV is a globally used classification system for psychiatric disorders, covering five axes (axis 1: the primary disorder or psychopathology, axis 2: personality disorders, axis 3: somatic diseases, axis 4: psychosocial problems, axis 5: the level of dysfunction). Patients had problems of higher complexity if they had comorbid problems on axis 2, 3, or 4.

Data on specialized care in 2012 were extracted from a national database for specialized care. This database covers all caregivers, such as psychiatrists and psychologists, working in Dutch specialized mental health care institutions, as well as solo operating entrepreneurs. Professionals working in specialized care are obliged by Dutch law to record all provided care that is paid for by health insurers in the national database. Therefore, virtually all Dutch patients treated in specialized
mental health care were represented in this database. Like primary care psychologists, mental health professionals in specialized care use the DSM for the classification of psychiatric disorders.

To investigate the feasibility of the new referral model, a case study was performed in 2014 in a large primary health care center in a northern region of the Netherlands. Eight GPs and two mental health nurses were working in the center. The primary health care center was well equipped to provide mental health care. All patients with mental health problems visiting one of the GPs between 1 January and 31 December 2014 were included in the study (n=408). They filled in the 4DSQ, an instrument that is frequently used in general practices to assess mental health problems. The 4DSQ consists of four scales: depression, anxiety, somatization, and distress. Furthermore, GPs assessed three aspects of the patient's mental health problems (risk, complexity, course of the symptoms) during a consultation. Next, the GP allocated the patient to one of four treatment options: GP, mental health nurse, generalistic basic mental health care, or specialized care. Based on the results of the 4DSQ and the GP assessment, we explored

what would be the treatment allocation according to the new referral model. We compared the treatment allocation according to the referral model with the actual treatment allocation. Thereby, we could calculate how many patients were allocated to treatment in line with the referral model. To explore the course of the symptoms, we performed a follow-up measurement. The practice assistant asked all patients to fill in the 4DSQ after three months; about a third of the patients completed it. We analysed with linear regression analyses whether the patient's symptoms did improve after three months, whether the improvement was dependent of treatment allocation, and whether the allocation was in line with the referral model or not.

We used the 4DSQ data for a simulation study to explore whether the questionnaire could be shortened through computerized adaptive testing (CAT). CAT selects only those items that are most informative for a certain patient, based on previous responses. In a simulation study, paper-and-pencil responses to a questionnaire are analyzed as if they had already been collected through CAT. A psychometric evaluation was performed to check if the collected data agreed with relevant assumptions. We calculated the informative value of the single items, and analyzed by how many items the questionnaire could be reduced without losing too much measurement precision.

Results

Prior to the reform, in 2012, a third of the patients treated by primary care psychologists (known since the reform as generalistic basic mental health care), and a fifth of the patients treated in specialized care, did not have a diagnosis of a psychiatric disorder according to DSM-IV criteria (chapter 2). About half of the patients with mental health problems who were referred by GPs did not (yet) have a diagnosis of a psychiatric disorder (classified with the ICPC). These numbers show that there is potential for substitution of care; those patients without a psychiatric disorder may be treated within general practice since the reform.

This study also showed that in the period 2010-2014, the volume of provided care to patients with mental health problems increased (chapter 3). In 2010, approximately 20% of GPs employed a mental health nurse. In 2014, this had increased to 83%. GPs, as well as mental health nurses, treat

increasing numbers of patients with mental health problems, with a slightly increasing mean number of consultations per patient.

In the period 2010-2014, we observed no task shifting from GPs to mental health nurses (chapter 3). The number of patients with mental health problems increased to a comparable extent in all general practices, regardless of whether the GP employed a mental health nurse or not. In general, GPs with a mental health nurse treated slightly more patients with mental health problems than GPs without a mental health nurse, but they did not use fewer consultations per patient, or more short consultations instead of long consultations.

Antidepressants were commonly prescribed in the period 2011-2015 to patients with anxiety or depression, during approximately 30% of episodes (chapter 4). Antidepressants were frequently prescribed to patients with a depressive or anxiety disorder, but also sometimes to patients with only mild symptoms. We observed no decrease in antidepressant prescriptions over the years, but a slight increase. However, the number of antidepressants prescribed within the first week after establishing a (new) diagnosis was lower in 2015 than in 2011.

The total number of antidepressant prescriptions for anxiety or depression did not decrease with the employment of a mental health nurse in a practice (chapter 4). The number of antidepressants prescribed within the first week after establishing a new diagnosis was lower amongst patients who had a mental health nurse consultation during the episode. However, in the long-term, patients with and without a mental health nurse consultation received the same number of antidepressant prescriptions.

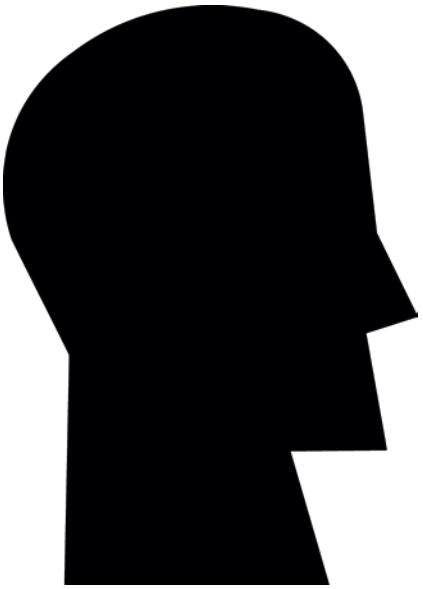
Our study showed that, in 2014, the triage by GPs working in a large primary health care center was mainly in line with the new referral model (chapter 5). After an assessment of their mental health problems, 87% of the patients were allocated to a treatment option that was in line with the referral model. For 42% of the patients, the treatment allocation was exactly concordant with the referral model. For 45% of the patients, the treatment allocation was less specialized than was 'allowed' by the referral model. GPs allocated many patients to treatment within general practice, around three quarters of them. The symptoms of the patients improved after three months, regardless of the treatment allocation and whether it was in line with the referral model or not.

Lastly, we found that the efficiency of the 4DSQ, a frequently used instrument to assess mental health problems in general practice, may be improved through computerized adaptive testing or CAT (chapter 6). On average, the total number of the 4DSQ items may be reduced by half.

Conclusions

Recently, the mental health care provided in Dutch general practices has considerably changed in some aspects (increased volume of provided care, changes in triage), but less in other aspects (no task shifting from GPs to mental health nurses, no decrease in antidepressant prescriptions). The recent developments in mental health care in general practice could prevent patients from needing specialized care, and could thereby reduce the total mental health care costs. At the same time, the recent developments put a burden on the workload of both GPs and mental health nurses, and may form a risk for the accessibility of general practice mental health care.

Samenvatting



Samenvatting

Achtergrond
De huisarts heeft in Nederland als poortwachter een belangrijke rol in de geestelijke gezondheidszorg (GGZ). Mensen die professionele hulp willen bij het omgaan met psychische klachten gaan in eerste instantie naar de huisarts. Veel mensen met psychische klachten kunnen binnen de huisartsenpraktijk worden behandeld, met behulp van 'watchful waiting', psychotherapie of medicatie. Huisartsen hebben voor de diagnostiek en behandeling van mensen met psychische klachten evidence-based richtlijnen tot hun beschikking, die gebaseerd zijn op het 'stepped care' principe. Stepped care houdt in dat mensen eerst een zo licht mogelijke interventie aangeboden krijgen, en pas als deze niet werkt meer intensieve behandeling krijgen.
Ondanks dat veel mensen met psychische klachten binnen de huisartsenpraktijk kunnen worden behandeld, nam het aantal mensen dat behandeld werd in de – duurdere – gespecialiseerde GGZ de laatste decennia behoorlijk toe. Hiermee stegen de kosten van de GGZ aanzienlijk, nog meer dan die van de somatische gezondheidszorg. De vermoedens waren dat sommige huisartsen toch te veel mensen met psychische klachten doorverwezen, voor de zekerheid, en dat veel mensen na doorverwijzing niet meer terug kwamen bij de huisarts, ook als zij geen psychiatrische stoornis bleken te hebben. Hierdoor zouden te veel mensen met relatief milde symptomen en zonder psychiatrische stoornis in de gespecialiseerde GGZ behandeld worden.

Om de geestelijke gezondheidszorg betaalbaar te houden en het aantal mensen onder behandeling in de gespecialiseerde GGZ terug te dringen, werd op 1 januari 2014 in Nederland een hervorming van de GGZ ingevoerd: de Basis-GGZ. Een belangrijk onderdeel van deze hervorming was de introductie van een nieuw verwijsmodel voor huisartsen. Volgens het verwijsmodel zouden huisartsen alleen nog mensen met een hoog risico of zeer complexe klachten moeten verwijzen naar de gespecialiseerde GGZ. Mensen met minder complexe klachten, maar die wel voldoen aan de DSM criteria voor een psychiatrische stoornis, kunnen worden verwezen naar de generalistische basis-ggz. Alle mensen met psychische klachten die niet voldoen aan de formele criteria voor een psychiatrische stoornis, en bij wie

geen sprake is van een hoog risico, zouden binnen de huisartsenpraktijk behandeld moeten worden.

Om huisartsen in staat te stellen meer mensen met psychische klachten binnen de huisartsenpraktijk op te vangen, kunnen zij sinds 2008 ondersteuning krijgen van een praktijkondersteuner GGZ: de POH-GGZ, meestal een sociaal-psychiatrisch verpleegkundige of psycholoog. De belangrijkste taken van de POH-GGZ zijn de diagnostiek en kortdurende behandeling van mensen met psychische en sociale problemen. Huisartsen kunnen verder gebruik maken van de consultatie van specialisten en e-mental health.

De recente hervorming heeft naar verwachting een grote impact op de zorg voor psychische klachten in de huisartsenpraktijk. Zo wordt er een verschuiving verwacht van mensen zonder complexe problematiek vanuit de gespecialiseerde GGZ naar de eerstelijnszorg, en vooral naar de huisartsenpraktijk (substitutie). Dit zou betekenen dat huisartsenpraktijken steeds meer zorg aan mensen met psychische klachten moeten leveren. Ook binnen huisartsenpraktijken zou er veel kunnen veranderen. Zo zou de POH-GGZ taken kunnen overnemen van de huisarts en een deel van de patiënten met psychische klachten kunnen opvangen. Verder zou de mogelijkheid tot behandeling door de POH-GGZ er toe kunnen leiden dat huisartsen minder vaak of minder snel antidepressiva voorschrijven bij angst of depressieve klachten. In de praktijk blijkt dat huisartsen op dit gebied niet altijd volgens de richtlijnen werken, bijvoorbeeld door een gebrek aan tijd of kennis. Zo worden antidepressiva vaak voorgeschreven bij milde psychische klachten en als eerste stap interventie, terwijl huisartsen deze middelen volgens de richtlijnen alleen zouden moeten voorschrijven bij ernstige psychiatrische stoornissen en pas nadat andere interventies niet werkzaam zijn gebleken. Dit zou veranderd kunnen zijn door de komst van de POH-GGZ. Tenslotte zou het nieuwe verwijsmodel van grote invloed kunnen zijn op de triage van huisartsen.

Het doel van deze thesis was het monitoren van (de veranderingen in) de zorg voor mensen met psychische problemen geleverd in Nederlandse huisartsenpraktijken in de periode 2010-2015, in de context van de recente hervorming van de GGZ. De centrale onderzoeksvraag was: in hoeverre is de zorg voor psychische klachten in de huisartsenpraktijk in recente jaren veranderd?

We onderzochten de volgende aspecten van de huisartsenzorg:

- Omvang van de geleverde zorg voor psychische klachten
- Taakverschuiving van huisarts naar POH-GGZ
- Antidepressiva voorschriften
- Triage van patiënten met psychische klachten

We verwachtten een verschuiving van mensen zonder psychiatrische stoornis vanuit gespecialiseerde GGZ richting de huisarts (substitutie) - en dus een toename in de omvang van de geleverde zorg in de huisartsenpraktijk, taakverschuiving van de huisarts naar de POH-GGZ, een afname in het aantal antidepressiva voorschriften door de mogelijkheid tot behandeling door de POH-GGZ, en een veranderde triage door de invoering van het nieuwe verwijsmodel.

Methoden

Voor deze thesis werd gebruik gemaakt van twee verschillende onderzoeksmethoden: analyses van gegevens uit nationale databases met de registraties van zorgverleners, en een case study in een gezondheidscentrum. Twee nationale databases werden gebruikt voor het in kaart brengen van de geleverde zorg in de eerstelijn (huisartsenpraktijken, en eerstelijnspsychologen – na de hervorming generalistische basis-ggz) en in de gespecialiseerde zorg.

We gebruikten gegevens uit huisartsenpraktijken die in de periode 2010-2015 deelnamen aan NIVEL Zorgregistraties eerste lijn. De patiënten die zijn ingeschreven in deze huisartsenpraktijken zijn representatief voor de Nederlandse bevolking. De praktijken vertegenwoordigden in 2010 in totaal ruim een half miljoen patiënten, en in 2015 ruim 1,5 miljoen. Alleen de praktijken met de meest complete registraties werden gebruikt voor deze thesis.

Huisartsen en POH's-GGZ registreren gegevens over consulten en huisvisites in het medisch dossier om zorg te declareren. Zij maken hierbij gebruik van CTG-codes (College Gezondheidszorg Tarieven). Bij elk consult wordt een diagnose geregistreerd op basis van de International Classification of Primary Care (ICPC). We analyseerden in dit onderzoek alleen gegevens over consulten en visites die betrekking hadden op een diagnose uit hoofdstuk P (psychische problemen) of Z (sociale problemen) van de ICPC. We maakten onderscheid tussen patiënten met een

psychiatrische stoornis (P70-P99) en patiënten zonder psychiatrische stoornis (P01-P29: psychische symptomen, of Z01-Z29: sociale problemen). Op basis van de geregistreerde consultgegevens stelden we voor ieder jaar en iedere praktijk vast of er een POH-GGZ werkzaam was. Verder registreren huisartsen voorschriften van medicijnen met het Anatomical Therapeutic Chemical Classification (ATC) systeem. We analyseerden alle voorschriften van antidepressiva (ATC-codes N06AA, N06AB, N06AF, N06AG, en N06AX). Voor 2012 waren er voor een klein aantal huisartsenpraktijken (n=25) ook verwijsgegevens beschikbaar.

We gebruikten verder de registraties van de eerstelijnspsychologen die in 2012 deelnamen aan NIVEL Zorgregistraties eerstelijn. Ook zij registreerden routinematig de zorg die zij leverden aan patiënten. In 2012 namen 534 eerstelijnspsychologen deel aan NIVEL Zorgregistraties. Zij leverden zorg aan 45.947 patiënten (15% van alle patiënten behandeld door eerstelijnspsychologen in Nederland). Eerstelijnspsychologen registreren een DSM-IV diagnose voor elke patiënt. De DSM-IV is een veelgebruikt classificatiesysteem voor psychiatrische stoornissen, opgebouwd uit vijf assen (as 1: primaire stoornis of psychopathalogie, as 2: persoonlijkheidsstoornis, as 3: somatische problemen, as 4: psychosociale problemen, as 5: level van dysfunctioneren). We gebruikten as 2 t/m 4 om in kaart te brengen hoe complex de klachten van patiënten waren.

Gegevens over de gespecialiseerde GGZ in 2012 kwamen uit een nationale database met gegevens over diagnose-behandelcombinaties (DBC's). Deze database bevat de registraties van alle zorgverleners, zoals psychiaters en psychologen, die in Nederland in de gespecialiseerde zorg werken, zowel bij GGZ instellingen als zelfstandig gevestigd. De professionals in de gespecialiseerde zorg zijn volgens de wet verplicht alle zorg die zij vergoed krijgen door verzekeraars te registreren. Daarom bevat de database gegevens van zo goed als alle patiënten in de gespecialiseerde GGZ. Net als eerstelijnspsychologen gebruiken zorgverleners in de gespecialiseerde zorg de DSM voor het vaststellen en registreren van psychische diagnoses.

Voor het onderzoeken van de invoering van het nieuwe verwijsmodel werd in 2014 een case study uitgevoerd in een groot gezondheidscentrum in een noordelijke regio van Nederland. Bij dit gezondheidscentrum waren acht huisartsen en twee POH's-GGZ werkzaam. Het gezondheidscentrum voerde een actief beleid op het gebied van de GGZ. Tussen 1 januari en 31

december 2014 werd bij alle patiënten met psychische klachten die de huisarts bezochten (n=408) de Vierdimensionele Klachtenlijst afgenomen, een veel gebruikte vragenlijst in de huisartsenpraktijk om psychische problemen in kaart te brengen. De 4DKL bestaat uit vier schalen: depressie, angst, somatisatie en distress. Verder brachten de huisartsen tijdens een consult de complexiteit van de klachten, het risico, en het verloop van de symptomen in kaart. Hierna wees de huisarts de patiënt toe aan één van vier behandelopties: huisarts, POH-GGZ, generalistische basis-ggz, of gespecialiseerde GGZ. Op basis van de resultaten van de 4DKL en de evaluatie van de huisarts werd ook bepaald wat de aangewezen behandeloptie volgens het verwijsmodel zou zijn. Vervolgens werd de behandeloptie volgens het verwijsmodel vergeleken met de daadwerkelijk toegewezen behandeloptie. Zo kon worden berekend hoeveel patiënten in lijn met het verwijsmodel werden verwezen. Om het verloop van de klachten in kaart te brengen werd een follow-up meting uitgevoerd. De praktijkassistente vroeg alle patiënten na drie maanden de 4DKL nogmaals in te vullen; ongeveer een derde deed dit. Met behulp van lineaire regressie analyses werd berekend of de symptomen van deze patiënten na drie maanden verbeterd waren, en of dit samenhing met de behandeloptie en of deze aansloot op het verwijsmodel of niet.

De data van de 4DKL werden vervolgens gebruikt voor een simulatie studie om in kaart te brengen of de vragenlijst ingekort zou kunnen worden via een dynamische methode ('computerized adaptive testing', CAT). Met CAT worden voor elke patiënt steeds alleen de meest informatieve vragen gesteld, op basis van eerdere antwoorden. In een simulatiestudie worden de gegevens van een papieren vragenlijst gebruikt, alsof deze al via de dynamische methode verzameld zouden zijn. We voerden eerst een psychometrische evaluatie om te onderzoeken of de gegevens geschikt waren om CAT toe te passen. Hierna werd bepaald hoeveel voorspellende waarde losse items hadden, en kon worden berekend hoeveel items minimaal behouden zouden moeten worden zonder (te) veel meetprecisie te verliezen.

Resultaten

Voorafgaand aan de hervorming, in 2012, bleek dat een derde van de patiënten onder behandeling bij eerstelijnspsychologen (na de hervorming: generalistische basis-ggz) en een vijfde van de patiënten in de

gespecialiseerde GGZ geen diagnose van een psychiatrische stoornis volgens de DSM-IV had (hoofdstuk 2). Ook had in 2012 ongeveer de helft van de patiënten met psychische klachten die de huisarts verwees (nog) geen diagnose van een psychiatrische stoornis (geregistreerd met de ICPC). Deze cijfers geven aan dat er potentie is voor substitutie van zorg; de patiënten zonder psychiatrische stoornis zouden na de invoering van de Basis-GGZ in de huisartsenpraktijk behandeld kunnen worden.

Ons onderzoek liet verder zien dat, in 2010-2014, de omvang van de geleverde zorg aan mensen met psychische problematiek in de huisartsenpraktijk toenam (hoofdstuk 3). In 2010 werkte nog maar 20% van de huisartsen met een POH-GGZ, in 2014 was dit toegenomen tot 83%. Zowel huisartsen als POH's-GGZ behandelden tussen 2010 en 2014 steeds meer mensen met psychische klachten, met een licht toenemend aantal consulten per patiënt.

In de periode 2010-2014 vond geen taakverschuiving plaats van huisarts naar POH-GGZ (hoofdstuk 3). Het aantal patiënten en consulten voor psychische klachten nam in deze periode in vergelijkbare mate toe bij alle huisartsen, ongeacht of zij een POH-GGZ in dienst hadden of niet. Huisartsen met een POH-GGZ behandelden gemiddeld iets meer patiënten met psychische klachten dan huisartsen zonder POH-GGZ in de praktijk, maar zetten niet minder of kortere consulten in.

Antidepressiva werden in 2011-2015 regelmatig voorgeschreven aan patiënten met angst of depressie, tijdens ongeveer 30% van de ziekte-episodes (hoofdstuk 4). Antidepressiva werden vaak voorgeschreven aan patiënten met een depressieve of angststoornis, maar ook aan patiënten met mildere symptomen. We zagen geen afname in het aantal antidepressiva voorschriften over de jaren heen, maar juist een lichte toename. Wel leek het aantal snelle antidepressiva voorschriften, binnen de eerste week na het eerste consult van een nieuwe episode, in 2015 te zijn afgenomen ten opzichte van 2011.

Het totale aantal antidepressiva voorschriften voor angst en depressie nam niet af met de komst van een POH-GGZ bij een praktijk (hoofdstuk 4). Wel werden minder vaak antidepressiva voorgeschreven binnen de eerste week van een episode aan patiënten die tijdens die episode ook een consult bij de POH-GGZ hadden gehad. Op de lange termijn gebruikten zij uiteindelijk wel even vaak antidepressiva als patiënten zonder consult bij de POH-GGZ.

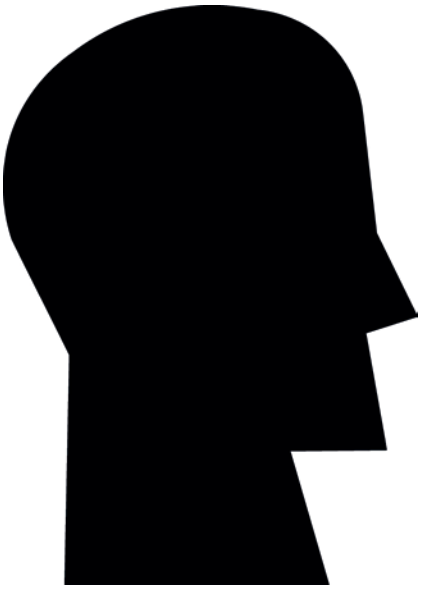
Ons onderzoek liet verder zien dat in 2014 de triage van huisartsen werkzaam in een groot gezondheidscentrum goed aansloot op het nieuwe verwijsmodel (hoofdstuk 5). Na een inventarisatie van de ernst van de problematiek verwezen zij 87% van de patiënten naar een setting die aansloot op de regels van het verwijsmodel; bij 42% was dit de setting zoals het verwijsmodel deze ook zou kiezen, en bij 45% was dit een minder gespecialiseerde setting dan was 'toegestaan'. Huisartsen waren geneigd veel patiënten binnen de huisartsenpraktijk te behandelen, ongeveer drie kwart. Over het algemeen verbeterden de symptomen van patiënten na drie maanden, ongeacht de setting waarnaar zij verwezen waren en of deze aansloot op het verwijsmodel of niet.

Tenslotte bleek dat de efficiëntie van de 4DKL, een vragenlijst veel gebruikt in de huisartsenpraktijk om psychische problemen in kaart te brengen, verbeterd zou kunnen worden met behulp van een dynamische methode, 'computerized adaptive testing' (hoofdstuk 6). Het aantal items van de 4DKL zou met deze methode ongeveer met de helft kunnen worden ingekort.

Conclusies

In recente jaren zagen we veranderingen in de huisartsenzorg voor mensen met psychische klachten op bepaalde gebieden (toename in omvang, veranderde triage), maar minder op andere gebieden (geen taakverschuiving van huisarts naar POH-GGZ, geen afname in het aantal antidepressiva voorschriften). De recente ontwikkelingen in de huisartsenzorg voor psychische klachten zouden een preventieve werking kunnen hebben en in het gehele systeem tot een kostenbesparing kunnen leiden, maar lijken tegelijkertijd de toegankelijkheid van de huisartsenzorg en de belasting van de huisarts en POH-GGZ onder druk te zetten.

Dankwoord
(acknowledgements in Dutch)



Dankwoord

Peter, wat heb ik geboft met jou als promotor. Niet alleen hadden we wekelijks overleg (met koffie), ik kon altijd bij je terecht. Ik herinner me mijn eerste werkdag bij het NIVEL, waarop je de tijd nam om me uitgebreid de kopiëermachine te demonstreren. Mijn mailbox bevat een berg aan mailtjes van jou met literatuur, vaak begeleid door een poëtische tekst met een knipoog. Je hebt een belangrijke rol gespeeld in het tot stand komen van mijn proefschrift. Daar ben ik je erg dankbaar voor! Ik vind het mooi dat ik aan het eind van mijn promotietraject uit ben gekomen op een visie op de GGZ die volgens mij aansluit op jouw ideeën daarover.

Derek, beren op de weg bestaan niet voor jou! Dankjewel voor je aanstekelijke enthousiasme en je goede ideeën voor mijn proefschrift, bijvoorbeeld voor het artikel over computerized adaptive testing. Je positieve instelling heeft me tijdens mijn onderzoek zeker gemotiveerd. Ons tripje naar Hagen was een onvergetelijke ervaring...

Dinny, ik zou heel graag jouw verdere bijdrage aan mijn proefschrift hebben gehad. We waren eens op een congres in Brussel, waar al dagen een nogal opvallende man met een wilde haardos rondliep. Hij had wel wat weg van Peter Groenewegen, en jij merkte op jouw droge manier op dat dit vast zijn geadopteerde tweelingbroer was. Aan deze herinnering denk ik af en toe met een glimlach terug.

Francois, ik vond het fijn dat jij als tweede promotor bij de laatste fase van mijn proefschrift betrokken wilde zijn. Ik heb erg veel gehad aan je goede suggesties voor mijn laatste artikel, introductie en algemene discussie. Hartelijk dank daarvoor!

Doortje, hartelijk dank voor de mooie opmaak van mijn proefschrift!

Beste leden van de leescommissie, Marjolein Berger, Giel Hutschemaekers, Annemieke van Straten, hartelijk dank dat jullie de tijd hebben genomen om mijn proefschrift te lezen en te beoordelen.

Rodrigo, bedankt voor het aanleveren van de NIVEL Zorgregistraties gegevens. Binnen een grote hoeveelheid aan gegevensaanvragen had je altijd

een (snel) antwoord op mijn vragen. Peter Spreeuwenberg, dank voor alle hulp en adviezen bij het analyseren van de grote databestanden.

Thomas Kok, Marjolein Jansen, Gerrit Corporaal, Theo Franck, en Evert Mantel, zonder jullie werk in Dokkum had ik twee artikelen voor mijn proefschrift niet kunnen schrijven. Hartelijk dank daarvoor! Berend Terluin, dank voor de prettige samenwerking bij het schrijven van het artikel over de 4DKL. Richard Boxem, bedankt voor jouw bijdrage aan het artikel over de substitutie van zorg.

Loes Stolk en Kyra Crezee wil ik graag bedanken voor hun gastvrijheid en de mogelijkheid om enkele dagen mee te lopen tijdens hun werk als POH-GGZ.

Hélène Struik en Elise Klijn, bedankt voor jullie bereidheid om mijn inhoudelijke vragen over de functie van de POH-GGZ te beantwoorden.

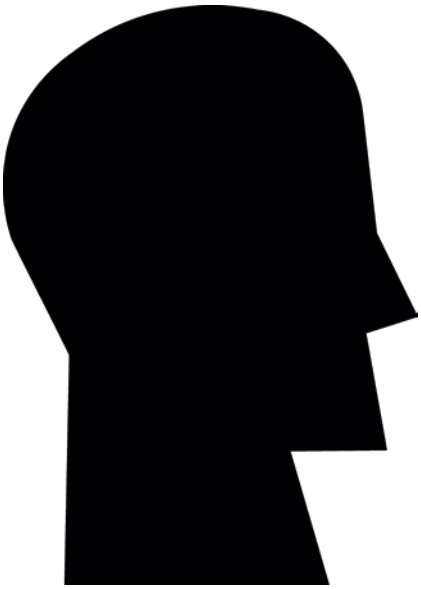
Lieve PV-bestuursleden (Pievie-ers), dank voor alle vrolijke momenten tijdens het organiseren van de borrels en andere activiteiten!

Lisa, ik heb met plezier mijn kamer op het NIVEL met je gedeeld. We konden tussen het werk door kletsen over van alles en nog wat. Ook buiten het werk kunnen we het goed met elkaar vinden. Ik hoop dat we nog vaak af zullen spreken, in Rotterdam, Wageningen of waar dan ook! Judith, jij was een vaste en gezellige waarde op kamer 3.07. Altijd behulpzaam en bereid om ons te voorzien van handige (Stata) tips. Ik vond het leuk om jou tijdens jouw promotieonderzoek te kunnen volgen en vond je later een voorbeeld voor mijn eigen onderzoek. Anne-Karien, ergens halverwege mijn promotieonderzoek kwam jij onze kamer binnen gevlogen. Na een week was het alsof je er al jaren was. Dank voor je luisterend oor, je wordt vast een geweldige huisarts! Jeanine, aan het einde van mijn promotieonderzoek hebben we nog korte tijd onze kamer gedeeld, dankjewel voor de gezellige dagen in die tijd.

Taïs, bedankt voor het boek dat mij op het idee bracht om het artikel over antidepressiva te schrijven. Lieve Roy en Lenneke, wat fijn dat jullie tijdens mijn verdediging naast mij staan!

Lieve paps (papz) en mams (mamz), dank dat jullie er altijd voor Frank en mij zijn. En dat het dan lijkt alsof dat heel gewoon is. Het is een fijn idee dat ik altijd met wat dan ook bij jullie terecht kan. Jullie zijn superouders en een prachtig voorbeeld van hoe van het leven te genieten! Ik ben er ontzettend trots op en blij mee dat ik dit proefschrift mag verdedigen in jullie aanwezigheid. Love you!

Curriculum Vitae



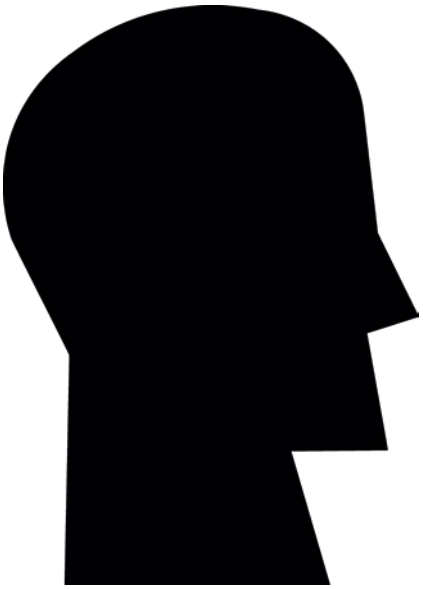
Curriculum Vitae

Tessa Magnée was born in Capelle aan den IJssel, the Netherlands, on July 3rd 1984. She completed secondary school at Emmauscollege in Rotterdam. From 2003 to 2007, she studied Biological and Cognitive Psychology at the Erasmus University in Rotterdam. In 2007, she obtained an MSc degree with a thesis on sex differences in mental rotation. From 2007 to 2009, she studied Media and Journalism at the Erasmus University in Rotterdam, and obtained an MA degree writing a thesis on 'happiness magazines'.

In 2009, Tessa started her career in science, as a research assistant at IVO in Rotterdam. From 2010 to 2012, she worked as a junior researcher at the department of Public Health at the Erasmus Medical Center in Rotterdam, exploring the equity-specific effects of lifestyle interventions. In 2011, she completed three courses in clinical psychology at the Open University.

In 2012, she began working as a researcher at NIVEL (Netherlands Institute for Health Services Research) in Utrecht. She worked on several projects, covering different topics, including lifestyle interventions, integrated primary care, e-health self-management programs for employees with a chronic disease, and mental health care. During her research activities, from 2012 to 2014, she followed a psychologist internship at a mental health care institution. Since 2013, Tessa has worked on her PhD project, focusing on mental health care provided in Dutch general practices.

List of publications



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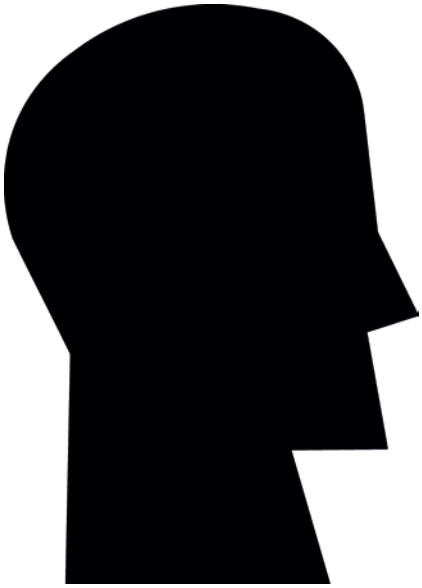

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